The Chemical Age

A Weekly Journal Devoted to Industrial & Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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Defining the Merchant Position

A SUSPICION has grown up of late that the attitude of Government departments is a little lacking in recognition of the great part which the merchant plays in trade developments, and is correspondingly too kindly towards the manufacturing and other interests. Inquiries, we believe, would show that any such apparent preference arises from the circumstances of the case, and forms no part of deliberate departmental policy. The truth is that the merchant interests of the country, whether as a whole or in relation to particular trades, have been notably lacking in collective organisation. The workers, contributing to their trade unions a liberal percentage of their income, have built up huge organisations with ample funds, and where proposals are contemplated affecting their interests it is easy to consult their representatives or for the organisations to take action themselves. Similarly, the manufacturing class has formed associations capable of collective action, and here again interchange of views is easy. In the case of the merchants, though they constitute an essential link between producer and consumer, very little organisation is in existence for these purposes. If their interests appear sometimes to be overlooked, it is not because the official attitude is unfriendly, but because there is no convenient machinery for collective consultation. Judgment is simply allowed to go by default.

In view of the large extent to which trade is still under Government control and the prospect of new regulations on imports and exports the merchant class is gradually realising the need of taking measures for their own protection. It may be that their functions overlap occasionally, but in the main the function of the merchant is sufficiently distinct to admit of a good working definition. That function is to link up the producer with the consumer, to manage the delicate business of sale and distribution, and to accommodate supply to demand not only at home but throughout the world. The business takes in the processes of transport, shipping, finance, and steering through the network of regulations which apply to international trading. It carries with it heavy responsibilities, and calls for experience, judgment, and the instinct for arranging "deals." The merchant is, in short, the promoter, the catalyst, of commerce. There can be no question of his elimination from the machinery of trade. Even where the manufacturer decides to be his own salesman and distributor, he does not eliminate the merchant; he merely becomes a merchant himself, and seeks to unite, sometimes with indifferent success, the two functions under one control. But except for the few exceptionally large concerns this combination is impossible. The producer finds it most convenient to stick to his own job and to leave the art of sale and distribution to the man who has specialised and attained a traditional skill in it.

It is singular that a body which plays such a vital part in national and international trade should have been so long content without any corporate and collective life, and it is no matter for surprise, with experience of the growth of official regulation of trade, that merchants are beginning to feel the lack of it. To take the particular case of chemicals and dyestuffs, we have of late heard much of the need of a representative body, and some definite steps have been taken towards this end. Assuming a general desire to exist for such an organisation, what are the essential points to be provided for? First, it seems to us, the organisation should be definitely restricted to the *bona fide* merchant class. Occasionally a merchant may be interested in manufacture also, but it is usually possible, by the proportions of the two interests, to determine which class he primarily belongs to. On the other hand, it seems useless to attempt to combine in one body the whole range of interests from the manufacturer at the one end to the consumer at the other, for these interests tend to neutralise one another, and to confuse the main interest. What we believe most

Government departments would welcome is one recognised and responsible body representing the merchant interest as distinct from that of the manufacturer, and capable of being used for authoritative consultation and advice.

The second principle is that such a body should be limited to definitely British interests or to those firms of non-British origin which have complied with the legal conditions entitling them to recognition. To open the doors wider than this would be to risk a clashing of interests, for in dealing with Government departments and with Government policy the position of British trading firms might be found to conflict with those of foreign trading firms, and it would be impossible for one body to speak for both. Thus the advantage of organisation would be lost, for the chief object it is intended to achieve is the ability to speak on questions of policy with an undivided voice.

If these two fundamental conditions are accepted there ought to be no great difficulty, taking the chemical and dyestuffs industry as a case in point, in organising the trader community throughout the whole country into a really great and reputable body, to which every member of it would consider it a duty and privilege to belong.

The Water Gas Process

We have recently heard from one of our original subscribers who reminds us of the fact that in our issue for June 28th, 1919, Dr. John Harger called attention to the shortcomings of the modern water-gas plant, and spoke of the economy in fuel and improvement in gas quality which would follow the introduction of some automatic arrangement for reducing the steam flow in accordance with the prevailing temperature of the fuel bed. In almost all forms of water-gas plant the steam is passed through the fuel in unrestricted quantities during the whole of the gas-making period, with but little thought as to the effect of the gradually falling temperature of the hot carbon. The result is that during the later minutes of the "run" in particular, only a portion of the steam is decomposed, while the carbon dioxide content of the gas is greatly increased, owing, in part, to the over-cooling action of the steam and in part to its oxidising effect on the carbon monoxide in the gas leaving the generator.

Obviously, such a state of affairs is wrong from both the theoretical and the practical standpoints, and our correspondent draws our attention to the immense improvement which has followed the introduction of a special form of regulator. This regulator (British Patent 16,311/19) is so designed that, without any attention whatever on the part of the operator, the steam flow is gradually curtailed as the fuel bed drops in temperature. The regulator is particularly sensitive and convenient for adjustment; so that, in accordance with the size and type of water-gas plant in use, it may be arranged to give a prescribed maximum steam flow, and a definite minimum flow, while the rate of fall from maximum to minimum is also adjustable. Figures given by our correspondent show that by installing the regulator he has, on an average, been able to halve the carbon dioxide content of his water gas, with a reduction in gas capacity of the plant of only some 4·7 per cent. It is a remarkable fact, however, that this 4·7 per cent. represented approximately 35,000 cubic f[illegible] 31,000 cubic feet of this was [illegible] dioxide. Thus the r[illegible] to only 4,000 cubic feet [illegible] constituents. Perhaps, more striking is the saving in fuel used for steam; for, as our correspondent says, his plant is, as water-gas plants go, only of a medium size, and yet he has been able to save 7,500 lb. of steam per day, as compared with previous working without the regulator. The point we think is an important one, for water-gas nowadays is by no means the monopoly of the gas undertakings, and there appears to be a growing demand for its use on a large scale in chemical and metallurgical works.

From Explosives to Dyes

A special report (No. 11) of the United States Tariff Commission draws attention to the close connection between the production of modern high explosives and dyes. It is shown that the dye factory can quickly be converted into an explosive or poison gas factory, using, moreover, the same staff, materials and apparatus with but slight modification. A reversal of the German procedure has, therefore, taken place, for while Germany turned her peace time industries to account in war, the United States has converted its war-time plant to peace-time activities. Many of the U.S. explosive plants have, in fact, been converted for the manufacture of both dyes and intermediates, and attention is directed in the report mentioned to the relation between, for example, sulphur black and picric acid. Up to the last stage the manufacture of these two products is identical. Benzol, the most plentiful of the crudes, is treated with chlorine giving monochlorbenzol and muriatic acid. The former is purified by distillation from a by-product of dichlorbenzol and then treated with a mixture of sulphuric and nitric acids, giving dinitrochlorbenzol. This substance is then boiled with a solution of soda, yielding sodium dinitrophenol, which in turn may then be converted into picric acid by treatment with muriatic, nitric, and sulphuric acids or into sulphur black by treatment with sodium sulphide and sulphur. By further treatment with chlorine gas, picric acid may be converted into the poison gas chlorpicrin.

It is well known that these military considerations have received great weight in the development of the German dye industry, and that the relatively small amount of auxiliary equipment for converting the dye plants into explosive plants was provided in advance ready for instant use. Documentary proof of this would be difficult to secure, but the fact is generally accepted by those familiar with the trade, and has been confirmed by reports of inspections of the German factories made since the signing of the armistice. A relation similar to that discussed above, although not so close, exists between trinitrotoluene and various dyes derived from toluene. Tetranitroanilin, tetranitromethylanilin, and various nitrocresols are all explosive substances of military value, derived from coal tar. These can be speedily produced in large amounts by a nation having a well-developed dye industry, but only with much greater difficulty and loss of time, if at all, by a nation without a dye industry. From the point of view of national safety the moral is obvious.

Fair Policy

THE Presi... ...rade has done a wise thing in appoi... ...pecial ... ...to consider the general policy to be follow... in ... organisation of future British Industries fairs, and the committee is equally wise in taking a census of commercial opinion throughout the country. These fairs may now be regarded as emerging from the experimental stage, and in establishing them upon permanent lines the plan of taking all sections of British trade into consultation should be a guarantee of good policy. We imagine that the general feeling will endorse the plan of having fairs at more than one centre, provided the distribution of the exhibits is well done. On the other hand there may be advantages in having the fair organised at a single centre. It would make a more impressive picture of British products, it would save time and travelling expenses to foreign buyers, and in the matter of organisation concentration would be simpler than duplication. However, these matters may best be decided by the commercial community itself.

One point of special interest to be determined is whether factors and merchants, as well as manufacturers, should be admitted as exhibitors. The official view would probably favour the policy of restricting the exhibitors to the actual producers. As against this, however, if the fairs are intended to develop British trade throughout the world, it might be a grave mistake for the merchant class to be excluded. It is the merchant's art to spread the net for the purchasing class, and the wider the net is spread the better for trade. The duplication of exhibits, therefore, instead of being a disadvantage, should prove rather the reverse, for a British manufacturer who restricted his products to his own stall would be sure to miss many valuable inquiries. On the other hand foreign buyers, accustomed to deal through British merchants, would certainly visit the merchant section, and products not represented there would be at a serious disadvantage. It seems to us, therefore, that the exhibiting as well as the selling agencies associated with the fairs should be as extended as possible, and that the policy of restricting the exhibiting class to manufacturers would not benefit either themselves or any other interest.

The Control of Profiteering

THE authorities charged with the administration of the Profiteering Act have admittedly a difficult task, and it was to be expected that in the interpretation and enforcement of its provisions many bad cases would escape and slight technical offences entail heavy penalties. There is a feeling among dealers that sometimes the conditions of trade are not fully appreciated, and that cases coming up for investigation may suffer from this lack of inside knowledge. On one point, we believe, the opinion of reputable trading houses is unanimous. Where manufacturers, in the public interest, agree to sell at a fixed figure, firms supplied at that figure should honourably observe the conditions of supply and not seek to take advantage of a denuded market.

On the other hand, it must be remembered that the market price at which chemicals are quoted may be simply a nominal figure, since often there are no supplies obtainable, and a trading firm, in order to meet the convenience of clients, may be put to much extra trouble and expense in obtaining supplies. In such cases all that is claimed is that the special circumstances should receive full consideration. Nominal quotations are not a safe or sufficient test. The essential point is—what is a fair trading profit on any particular transaction? and this can only be determined by a full disclosure and consideration of all the circumstances. Profiteering Tribunals are no doubt anxious that justice should be done to those who appear before them as well as to the public, and we believe that most of them would welcome the assistance of responsible trade organisations in preserving an equitable balance between the two interests. Consultation between the trade and the authorities is certain to foster mutual confidence, and the knowledge that the authorities have the support and assistance of the great body of reputable traders must give an additional weight to their decisions. The fuller the exchange of views, therefore, between them, the better it will be for all interests concerned.

Oil in Alsace

IT is not generally known that Alsace can boast of quite a thriving oil industry. The centre of activity is at Pechelbronn, and that this place is an example of one of the earliest attempts to develop oil production on a commercial scale will be gathered from the fact that the wells were first worked nearly two hundred years ago. Although, compared with the modern oil fields, the output at Pechelbronn is small, the production amounts to some 50,000 tons of petroleum products per annum, and has played a most helpful part since the problem of fuel on the Continent became so acute. Naturally, the local industry is of exceptional importance to France, and a staff is continually employed in a search for new deposits. Moreover, in order that the best results may be obtained, the plant utilised is of the most efficient and modern type. The area worked amounts to 110,000 acres; forty-four drilling machines, mostly electrical, are in operation; and five hundred oil pumps are now in use. It is said that a new deposit was recently discovered after drilling to a depth of some 2,000 ft, the new well giving a yield of 50 tons of crude a day. Modern refineries are to be installed capable of distilling 73,000 tons of crude petroleum per annum, the distillation being carried out by the continuous process with a perfect vacuum. Owing to the peculiar difficulties associated with working the deposits, very little was done durin the war, but the importance of the industry may be gathered from that fact that two thousand workmen are now employed.

The Calendar

August 24–28	British Association	Cardiff.
Sept. 21–24	Iron and Steel Institute: General Meeting.	Cardiff.
Oct. 9	Mining Institute of Scotland: General Meeting.	Edinburgh.
18	Physical Society of London and Faraday Society (Joint Meeting): "The Physics and Chemistry of Colloids."	London.

A New Volume of "Gretna Factory Studies"

War Experiences Reviewed by Mr. W. Macnab

The Ministry of Munitions, Department of Explosive Supply, may be congratulated on making public the important information in the new volume entitled "Preliminary Studies for H.M. Factory, Gretna, and Study for an Installation of Phosgene Manufacture." We hope to notice it more in detail in future issues. For the present, it must suffice to reproduce the excellent introduction contributed by Mr. W. Macnab.

In the Factories Branch of the Department of Explosives Supply a large amount of technical information has been produced and collected by Mr. Quinan and those immediately associated with him, and it was felt that as much as possible of this information should be made available to the public. The records are being systematically indexed and arranged, and are being prepared for publication as quickly as possible.

Mr. Quinan introduced methods of studying the various problems which arose, and of setting out the results, which were clear and very helpful to all who were connected with the erection of the plant and works, or the subsequent manufactures carried on.

No doubt some of the more highly organised and scientifically directed chemical works have developed excellent methods of dealing with their problems, but their methods and the results of their researches are not available to the public.

No excuse, however, need be offered in presenting matter which shows the manner in which technical problems should be scientifically studied and set out before operations are undertaken, and how manufacturing operations should be scientifically controlled.

Some of the matter being prepared for publication sets forth the studies and calculations which formed the basis on which a factory was constructed, and are given as examples of an excellent way of treating and presenting the matter.

Mr. Quinan insisted that the steps in a calculation by which certain results were obtained should be set forth so distinctly that they could be easily followed, and that the author himself might be able to trace the line of his reasoning and action, after the matter had passed from his attention, without having to rack his brains to see how he obtained his results. He thoroughly believed in the advantage of letting all those engaged in directing and carrying out work have the fullest possible understanding of what they were doing, and this policy bore excellent fruit in the results obtained at the works managed by the Factories Branch, which were carried on under the initial disadvantage of staff and workers largely without expert knowledge of the work they had to do.

Although information now given refers to specific manufactures or processes which, in the case of explosives, are not likely to call for the erection of new works in the near future, the principle of systematically and carefully calculating the quantities of raw materials and finished products, at all stages of the processes, so that plant of proper size and a well-balanced works can be constructed, applies to all industries. Experience shows that the more earnest thought and study, based on all available scientific data, which are put into the plans for a works or process at its inception, before plant is ordered or building operations begun, the sooner and more certainly will satisfactory results be obtained.

The study for an installation of phosgene manufacture, which is given, well illustrates Mr. Quinan's method of tackling a technical problem in a thoroughly scientific manner, and should be particularly illuminating to students and others in showing how physico-chemical data are utilised for industrial ends.

Weaknesses in Technical Education

Many records are available for plant results in various manufactures and of experiments on the large scale, which will appeal more strongly to those in charge of chemical works.

It is a matter for much satisfaction that from the enormous amount of thought and effort which was expended on means of destruction much can be rescued which will be helpful to the nation in its peace time work.

The war has shown up very clearly many of the weaknesses in our technical educational system. On the other hand it has brought many professors into close association with technical men and processes, and this no doubt has produced a greater appreciation on their part of the necessity of providing more technical instruction for students who propose to enter chemical industry. Many of the drawings and reports to be issued should prove of much assistance to universities and teaching institutions in carrying out technical instruction, by showing good methods of applying scientific data to industrial questions and, by presenting concrete examples, thus vitalise to many students the apparently less interesting field of thermo chemistry and other branches of physical chemistry.

The resource and ingenuity displayed in meeting the complicated problems arising from the necessity of devising means of protection against gas attacks and the production of gases for attacks show that the country possesses ample chemical ability to meet any calls which may be made.

But to meet the chemical industrial competition closer co-operation between the more strictly theoretical and technical workers is essential, and above all a class of business and financial men must be developed whose education has been sufficiently broad to enable them to realise the sure foundations on which scientific conclusions rest, and to trust their scientific and technical advisers.

In this country there has been too little mutual trust and appreciation of each other, and it must be the serious endeavour of all concerned to develop such sure methods of working out new processes in all details, and clearly presenting the results, that the business man may have a well defined picture of the advantages to be gained, and the cost to be incurred, in so far as the factory is concerned.

Chemical enterprise has suffered much from the comparative ignorance of many who entered upon its difficult path. On the one hand, the air of mystery which often surrounds it to the lay mind leads to expectations of almost magical results and exaggerated hopes which are rarely fulfilled.

The business man is often not entirely to blame, for the chemical projects have often been presented to him in a very insufficiently considered manner, so that the attractive points—although no doubt truly put forward—were not sufficiently counterbalanced by a well-reasoned statement of all the sides of the question. Hence disappointment and loss of faith, or, at any rate, considerable scepticism in regard to future chemical projects.

On the other hand, if a non-scientific man has the final decision in regard to a chemical process, his lack of understanding of his technical staff and of faith in their requests, which may go against his so-called common sense, may be as prejudicial as the unreasoning hope before referred to. Unfortunately this trouble arises from the lack of general scientific knowledge among all classes of society, and the failure to appreciate what scientific work stands for, as well as reluctance to make use of the scientific information which is available.

Chemical Industry and World Competition

But if we are to hold our own in the world competition, the attitude to chemical industry must be altered very considerably. Greater knowledge on the part of those directing chemical work and the substitution of the rule-of-thumb men (who are often in complete charge of complicated processes) by intelligent chemists who will make it possible for real progress to be made, are among the more obvious reforms to be introduced.

Shrewd common sense and good powers of observation have enabled some of our non-scientific owners or managers of chemical factories to achieve sometimes a considerable amount of success, which has developed in them a corresponding contempt for, and distrust of, scientific control.

It must be admitted that when a young chemist has been taken on in such a works the results frequently have been unsatisfactory, due to lack of knowledge on both sides. Truly Solomon was right when he insisted: "Get wisdom, get understanding." To get it, however, implies hard work and a certain amount of modesty which does not count too much on the influence of heredity.

Our teaching institutions do not turn out industrial chemists ready to step into a works and successfully control processes straight away, nor perhaps is it to be expected or desirable that they should, for, after all, works' experience and the controlling of men can only be learned in a works. Sometimes the young chemist's position in a works run on rule-of-thumb principles is very trying. His inexperience may lead him into trouble, and his mistakes will cause unholy joy to the rule-of-thumb foreman and anger or dissatisfaction to the uncomprehending employer, with the probable result that he is confined entirely to the laboratory or even dismissed, and scientific control has thus apparently been found to be a fraud.

Or he may develop an unjustified contempt for the "rough and ready" people with whom he has to work, forgetting that the ability to produce something, although unable scientifically to understand and explain the process, is worth more in a works than scientific comprehension of the process along with lack of technical ability to carry it out, or knowledge of pitfalls should a change be undertaken in the existing practice.

It seems ridiculous to have to plead for the full and proper use of chemists in chemical works, but to those acquainted with the smaller works, and even some of the larger ones, it is known that the necessity exists.

The difficulty would be largely solved if men with good chemical training were in charge of chemical works, for then they could see to the works' training of the young chemists who came under them and prevent them from making rash experiments and, at the same time, utilise to the full extent any knowledge or initiative which they might possess. Above all, such a manager would not be jealous of the chemist.

Chemical Renaissance in France

Repeated opportunities of visiting during the war most of the French factories employed in making explosives and allied chemical products filled one with great admiration for the work accomplished and the developments carried out, and it is evident that a chemical industrial renaissance has taken place in France and manifestly they intend to develop chemical manufacture which the war has shown they can carry on well.

In this country there has also been great chemical development, and a new spirit of scientific control and efficiency has been made known widely. Magnificent results have been achieved, but not through rule-of-thumb methods, which one would fain hope were buried for ever.

It has been abundantly shown that the chemical knowledge and ability in this country, when adequately directed, can hold its own with that of any other land, but the stimulus of the common aim of quantity of output, and excellence of production, generated by the war, must not be allowed to die out. Every endeavour should be made by professors and students, technical and business men interested in chemical manufactures, as well as by the Government, to get to understand better the aims and requirements of each other, and co-operate in remedying any weaknesses in our system, and in developing chemical industry on sound scientific lines.

Progress means change, and the chemical manufacturer should be prepared for having one process ousted by a newer and better way of working, and should reckon with the necessity of scrapping plant from time to time if he is going to keep pace with improvements.

Sometimes chemical enterprise is deprecated on the ground that no sooner is one method established than a new process threatens to supersede it, and therefore there is no certainty of permanence. A truly progressive spirit is necessary, and the mental laziness which tends to condemn new ideas because they upset a smoothly running process must be replaced by greater alacrity to undertake new methods with all the attendant trouble, otherwise a back seat will soon be taken by the firm or nation which will not wake up and keep awake. More friendly and intelligent co-operation between masters and staff and ordinary workers will do much to make progress easier. Already there are indications of sounder and humaner ideas coming to the surface, and seeing we have all to spend the greater part of our life working in some capacity or other it is surely worth while endeavouring to make the work as interesting as possible.

All the chemical manufacturers of the world have been greatly developed and stimulated by the war and competition will be keener than ever on all sides. The old rule-of-thumb practice which prevailed in so many of our chemical factories must go and be replaced by thorough scientific control of every stage of the process.

The necessary data and information are available in the country and there are plenty of chemists with brains who can carry on and develop the good work begun.

Advice to the Young Chemist

The young chemist who starts work in a chemical factory finds himself confronted with plant instead of apparatus, much of which involves mechanical devices of various kinds, pumps and blow casks for moving liquids, mechanism and compressed air for agitating liquids, various methods of applying heat, &c., &c. He should make it his business to get first hand knowledge of the way each part of the plant acts and a thorough understanding of the principles on which it works and is constructed.

To do this he should take his coat off when a breakdown or stoppage occurs and see for himself what has been the cause, and learn and help to put matters right. Only in this way can he develop that knowledge of the capacities of a plant and sympathy with it, which will enable the best results to be obtained.

A plant should be treated well and considerately, and its legitimate working capacity not over taxed. Careful attention to its smooth running, and maintenance in good condition, will be richly repaid in steady and uniform output.

There is nothing *infra dig.* in a highly trained scientific man doing the manual work involved in any of the processes under his control. Thereby he acquires a greater sympathy with and understanding of the men who have to do the regular manual work, which enables more just judgments to be formed as to what constitutes a fair day's work, and develops a mutual respect between chemist and workman.

One does not rejoice in dirty work *per se*, but, as a means to an end, viz., the intelligent understanding of plant and process, it should be cheerfully undertaken when occasion arises. Also the more carefully a plant is controlled the fewer interruptions and occasions for rough work will arise.

In the laboratory the chemist is trained to work quantitatively in so far as the main constituent he is preparing or substance he is analysing is concerned, but he is seldom required to account for the quantity of reagents he employs or the amount of heating or cooling and water for washing he utilises to effect his end.

In the factory these questions become of first-rate importance and must be carefully attended to. Every part of the process should be quantitative, and thereby it acquires added interest. The plant should be carefully calibrated, so that accurate measurements and weights of all materials used can be ascertained, and frequent stocks taken in order that yields and losses may be accurately known and any departure from the normal at once detected. Let the chemist keep prominently before him in large figures the losses, so that they may be a constant incentive to greater efforts to bring them down to the irreducible minimum.

In order that the chemist in charge of a process may work it to the greatest advantage he must be provided with all available knowledge on the subject, and encouraged to investigate by means of laboratory and plant experiments all obscure points and losses. To this end he should be taken as far possible into the confidence of his employer in regard to costs, so that he may realise the necessity of economy in all directions and be able to measure in one of the terms of industrial success, viz., money, the results of modifications and improvements which he may introduce.

The Value of Co-operation

Intelligent and sympathetic co-operation between those in charge of different departments is necessary if the greatest efficiency is to be obtained. Some works have followed the opposite practice and kept the sections in watertight compartments. Profits have no doubt been made under such systems, but not so great as when the heads and their assistants

have opportunity to discuss their several problems together and help each other by trying to work into each other's hands. Without this co-operation the nation loses greatly both in material and the improvements which are sure to flow from the brightening of intellects by free discussion together.

It sometimes happens that owing to exceptional circumstances profits are made alongside of great waste of material. Such a state of affairs is a national misfortune and, apart from the loss of material, which is also liable to be a nuisance to other people, it is demoralising and engenders a careless unscientific spirit in those conducting the operations. Preventible waste of any kind should be considered a sin against mankind.

One of the most powerful aids to success would be the intelligent and loyal co-operation between employer and employee with the object of getting the best results from the process being worked. Interest in the work in hand leads to better work being done, and one tendency of the time seems to be a revolt of the individual from being regarded as a "hand" or human machine, and a demand that some of the necessary monotony of the daily task should be brightened by learning as much as possible of the meaning of what is being done, and the ideals to be striven for.

The work of a chemist on a plant, although much more varied, can become monotonous too, unless he can see beyond the immediate daily round, and have the interest and stimulus of knowing the profit or loss on his operations, while his attention should be concentrated on the production of the manufactured article at the lowest cost and greatest efficiency.

But a profit—even a good profit on a product—is not the only criterion of true success.

The health conditions of the work-people are of paramount importance for successful work and contentment.

The experience at H.M. Factories, where the "Welfare" arrangements were best carried out, showed that it paid handsomely to look after the comfort and well-being of the workpeople.

It is realised that the conditions under which the Department conducted the various factories under its control were somewhat abnormal, but the advantage of letting the chemist and those in control of plant and processes have as full knowledge as possible of the results of working their own special department, as well as those on which they depended, was abundantly justified in the living interest which most of the men took in their work and the excellent results which they attained.

The common aim that united all during the war in doing the best they could for their country showed the advantage to be obtained if employers can enlist the sympathetic intelligence of those they employ, and let them feel they are part of one living corporation out to make the ideal of the actual, and have efficiency and harmony as the daily conditions of work.

It is hoped that much of the information that is now being made available will be helpful to all those desirous of making the chemical industry of this country the most efficient in the world.

Cleaning of Blast Furnace Gases

To the Editor of THE CHEMICAL AGE

SIR,—The authors of the excellent and instructive paper on the "Utilisation of Coke and Blast Furnace Gases," read before the recent Newcastle Meeting of the Society of Chemical Industry, refer to the different cleaning systems, and state that (1) the electrostatic system, while retaining the sensible heat, has not proved the possibility of cleaning sufficiently low for engine consumption. The best that can be hoped for is 0·3—0·6 gramme per cubic metre of gas; (2) the Halberg-Beth plant gives gas cleaner than the surrounding atmosphere; (3) if all the power is cut off the cleaning systems for a shorter or longer period, the electrostatic system would pass dirty gas, the wet washer would soon choke up, while the Halberg-Beth plant continues to supply the engines with clean gas.

With regard to (1) there is no such fixed limit for the dust contents of the gas emerging from a Cottrell Electrostatic Precipitator. The quantity of dust remaining in the gas is governed by several factors economical and technical, and can be reduced to very much less than 0·3 gramme per cubic metre, *if desired*.

This brings me to (2). Is it economically sound to clean a gas at a cost of 81 pence per million cubic feet to a degree exceeding that of the atmosphere for firing boilers and stoves, which after all consume the greater portion of the gas coming from the blast-furnaces?

(3) If the power is cut off from the Cottrell Precipitator it will pass dirty gas. Granted. But in view of the considerable power required for the fan and for shaking the bags in a Halberg-Beth plant—given in the statement of costs as 35 kw. per million cubic feet—the authors' claim that this system continues to deliver clean gas to the engines even if the power supply fails, would seem to require further elucidation.

In conclusion, another item in the cost of cleaning claims attention—viz., £900 per annum for a complete set of bags. Considering the number of small bags required for a Halberg-Beth plant of even moderate capacity, it must be concluded that the breakdown of a bag is a fairly frequent occurrence to necessitate a new set once a year. Now, what a hole means—even a small one—in a filter bag passing dust laden gases under a pressure of several inches of W.G. is well known to users of bag filter installations.—Yours, &c.,

18, Iddesleigh House, Caxton Street, London. H. J. BUSH.

Finance Act, 1920—Income Tax

To the Editor of THE CHEMICAL AGE.

SIR,—This Act, which has just been passed into law, brings important changes into operation. The principal alteration will be the method of charging income tax. It has become well-known to all taxpayers that for some years past the tax has been charged at varying rates according to the total income of the taxpayer, and that the rate has been higher on "unearned" income than upon "earned" income. These varying rates will now disappear altogether, and taxable income will as to the first £225 be charged at half the standard rate of 6s., and the remainder at the full rate.

Another important alteration is the amount of income which every person will be entitled to retain free of taxation. Hitherto this amount has decreased as the total income exceeded various limits, so that over £1,000 per annum the taxpayer paid tax on every £1 of income except in respect of life assurance premiums. All this is now varied, and every person, whether £1,000 or £100,000 income per annum will be free of tax on the first £225 if married (£135 if single), and on allowances in respect of children, adopted children, housekeepers and widowed mothers in certain cases, dependent relatives, &c., and then suffer half tax on the first £225 of the taxable balance.

All earned income will be diminished by 10 per cent. before being assessed to tax, but this reduction is limited to £200. In other respects earned and unearned income will be treated alike. Children with an independent income exceeding £40 per annum will not carry the allowance. Dependent relatives' allowance in the past was not given if such relative possessed an income exceeding £25, and this provision was reintroduced, but I pointed out to the Chancellor of the Exchequer that the old age pension had been increased recently to £26, and this would shut out this allowance unless he made provision to meet the difficulty. I suggested the allowable income should be doubled, and he has conceded this.

The benefit of section 25 of the 1919 Act (which relates to conversions into Victory Loan, and was inserted last year on my representations to the Chancellor) has, upon my suggestion, been extended to the 5¾ per cent. Exchequer Bonds, 1925. All British subjects resident abroad will now be treated as British residents for reliefs and allowances, and entitled to be repaid so much of the tax deducted from their British income as is in excess of their effective rate of tax.

Many other variations have been made in this year's Finance Act, which cannot very well be included within the scope of so short a letter as this, as they are principally technical matters that concern traders, manufacturers, &c. Super-tax will now be charged in all cases where the total assessable income from all sources exceeds £2,000, with special provision mitigating this when the excess is only of a small amount.—Yours, &c.,

67-68, Cheapside, London, E.C. 2, August 4. W. R. FAIRBROTHER.

Sampling and Analysis of Nitrate of Lime

The following interesting notes on the sampling and analysis of nitrate of lime are received from the Nitrate Trading Co., Ltd., 41, Eastcheap, E.C. 3, and are based on the methods in use in the laboratories at the Rjukan Synthetic Nitrate Factories in Norway.

Sampling

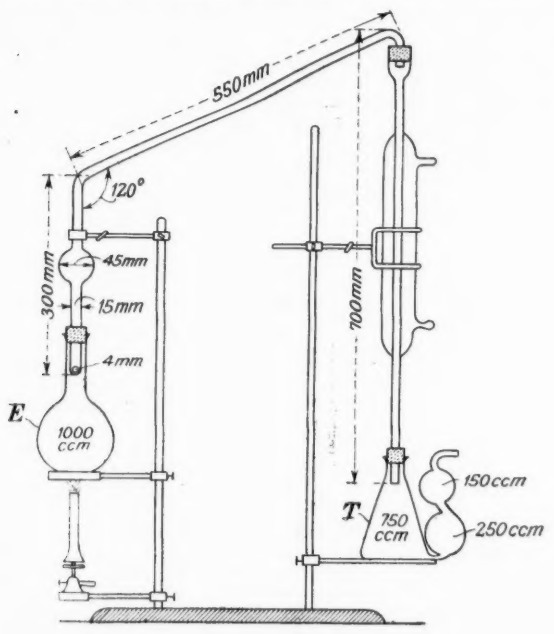
Samples are taken in the usual way by boring a hole and introducing a sampler into the middle of the barrel.

The nitrate being rather hygroscopic, it is necessary to use for keeping the sample a receptacle capable of being hermetically sealed, such as a wide-necked glass bottle with an air-tight stopper. The bottle must only be opened to receive each sample and must be corked up again immediately. When the sampling is finished, the bottle is shaken in order to mix the contents, which are then distributed into several smaller bottles, which should, of course, be perfectly dry; the bottles are corked up with paraffined cork stoppers and sealed in the usual manner.

The nitrate of lime being, as stated, rather hygroscopic, it is not always possible to guarantee a content of nitrogen of 13 per cent., each barrel being ,however, guaranteed to contain 13 kg. of nitrogen. In order to obtain an absolutely reliable result it is accordingly necessary to find out the weight of the contents of the barrels from which the samples have been taken. This is done by first weighing the barrel when it is full and then discharging the contents and weighing the empty barrel. The weight of the latter is about 10 kg. If some of the barrels appear to have been exposed to rain or the spray of the sea, samples should not be taken from them. Sampling should, of course, not take place in the open air when it is raining or when it is moist weather.

Analysis

The determination of the nitrogen is effected according to the method of Devarda and by means of the apparatus shown in the drawing annexed. The flask for reduction purposes *E*, the outlet pipe, the cooler and the Fresenius receiver *T*, are made entirely of Jena glass. 50 gr. nitrate of lime are dissolved in water and the solution is diluted to 1,000 ccm. 50 ccm. of



this solution, being the equivalent of 2·5 gr. of substance, are poured into the flask, the capacity of which is 1,000 ccm. There is then added 200 ccm. water, about 7 gr. of Devarda's alloy and 50 ccm. of caustic soda solution of specific weight 1·3, after which the flask is put into its place in the apparatus.

In the receiver there has already been introduced 50 ccm. $\frac{n}{2}$ H_2SO_4 and water sufficient to form a water-closing.

After a lapse of 1½ hours the solution is heated to boiling and the distillation is continued until there remains only about 100 ccm.

The excess of H_2SO_4 in the receiver is retitrated with $\frac{n}{5}$ NaOH; methyl-orange or paranitrophenol may be used as an indicator; the best, however, is methyl-red, which produces a very distinct change of colour.

Devarda's alloy and the caustic soda solution are tested for nitrogen by a blank test, 2 ccm. or 3 ccm. $\frac{n}{5}$ H_2SO_4 being introduced into the Fresenius receiver. After the distillation this is retitrated with NaOH, thus giving the figure of correction to be applied.

Notes on the Methods

Unless the utmost precision is required one may, of course, use a smaller weight, *e.g.*, 20 gr. of nitrate in 1,000 ccm. and take out 50 ccm., equal to 1 gr. substance, 4 gr. of Devarda's alloy as well as water and caustic soda solution of specific weight 1·3, as stated above. In this case 50 ccm. $\frac{n}{5}$ H_2SO_4 is used in the Fresenius receiver.

It is not necessary or even desirable that the Devarda alloy should be used as a fine powder, this being liable to give rather a violent reaction in the beginning; it suffices that the powder consists of grains less than half a millimetre.

The methyl-red indicator is produced by dissolving 0·5 gr. of methyl-red in 800 ccm. of alcohol of 96 per cent. and diluting the solution with water until it amounts to 1,000 ccm.

Methyl-red is more liable to reaction with carbonic acid than methyl-orange is, but the small amount of carbonic acid contained in ordinary caustic soda solution will, as a rule, have no effect. A caustic soda solution free from carbonic acid may, however, be easily obtained by dissolving 2·5 kg. of caustic soda in water and diluting this solution to 5 litres. In a solution of this concentration the Na_2CO_3 is insoluble and will precipitate out after a couple of days; the clear solution free from carbonic acid may be taken out of the vessel by means of a siphon and subsequently diluted to the concentration which is required.

Trials have proved that satisfactory results may also be obtained without the use of a Fresenius receiver by simply immerging the lower end of the cooler tube into the acid in the receiver, this receiver being an Erlenmeyer flask of half a litre capacity. After boiling 10 minutes this receiver may be lowered a little and the distillation continued in the usual manner.

By proceeding in this manner, however, the results have proved to be a little too low, the deficiency being from 0·02 to 0·05 per cent.

The evolution of hydrogen being in fact rather strong at the beginning of the operation, a small amount of the ammonia highly diluted with hydrogen is likely to escape through the acid in the receiver.

It is, therefore, preferable at all events to use the apparatus described above, by means of which good results are sure to be obtained.

Chemical Exports to United States.

IMPORTATION WITHOUT LICENCE is now permitted into the United States from all countries of the world of all commodities with the exception of certain chemicals, drugs and dyes. This should have an important, if not immediate, effect upon exchange. The exceptions to free importation are synthetic organic drugs, synthetic organic chemicals, dyestuffs, products derived directly or indirectly from coal tar, including crude and intermediate products and mixtures, and compounds of these products. Individual import licences will continue to be required for the importation of all these excepted commodities. Licences for the importation of dyestuffs from Germany in limited quantity may be granted in case similar kinds or satisfactory substitutes are unobtainable in the United States on reasonable terms as to price, quality and delivery, for the use of consumers to meet their manufacturing requirements. This rule applies also to synthetic organic drugs and synthetic organic chemicals of German make or origin. These regulations are very similar to the proposed prohibition of the importation of synthetic chemical preparations into this country except under licence.

A New Era in Gas Supply

By John T. Sheard

Mr. Sheard is chief chemist to the Sheffield Gas Company. He discusses below the changes which have been brought about in the gas industry as a result of experience gained during the war, and suggests that the new legislation under which gas undertakings are to operate may be followed by a cheaper supply of the commodity.

It is generally supposed that, with the coming into force of the Gas Regulation Act, a new era is about to open for the gas industry. It may, therefore, be of interest to review the course of events which have led up to the new legislation, and to survey the situation in the light of the opportunities which the new policy will offer for further developments in gas manufacture and supply.

In the first place, it must be remarked that we are not here concerned with the financial clauses of the Act, though they constitute one of the chief objects for which legislation was required. After these, the dominant features are the introduction of a new method of charging for gas, and the option that is given to a gas undertaking to decide, within certain limits, what quality of gas it will elect to supply. These, together with the setting up of machinery for ensuring that the gas consumer is duly supplied with the quality of gas contracted for, form the charter for legalising new departures which are being projected in the field of gas supply.

Basis of Quality

It is a very notable feature in the history of gas supply that, while the inherent potential value of the commodity has been gradually coming down, its value to the consumer, in practical utility, has not correspondingly suffered, but, on the contrary, has been enhanced in no inconsiderable degree. In other words, the quality of gas, or its capacity for developing light and heat, is, judged by a scientific standard, much lower throughout the country than it was, say, 40 years ago. Gas consumers, however, are generally obtaining greater illumination and more heat and power, from the consumption of unit quantity of gas, than was the case in the past. In years past the quality of gas was reckoned in terms of its illuminating power, that is, the luminosity of the flame developed by the burning of a definite quantity of gas through a specified burner. Obviously, when a better burner was invented, and its employment legalised, the same gas gave a higher illuminating power, or, alternatively, the former illuminating power could be obtained from an intrinsically lower quality of gas. After Welsbach's epoch-making discovery of the high lighting power which is developed by certain rare earths, when heated to incandescence, the term illuminating power, as indicative of the quality of gas, became somewhat of a misnomer, because the ordinary consumer was enabled to obtain, from the gas consumed, a lighting duty several times higher than was yielded by the standard burner with which the gas was tested. At the same time the applications of gas to purposes other than lighting were being developed and extended at such an increasing rate that it came to be seen that, instead of valuing the gas by its illuminating power, a juster and more satisfactory method was to measure its calorific or heating power. Thus it came about that the photometer was displaced by the calorimeter in gas-testing stations, and by the year 1910 London gas was being valued in calories instead of candles.

Effect of High Gas Yields

While these changes were taking place in the methods of valuing gas, and in the fuller utilisation by the consumer of its heating power, great developments were being made by gas engineers in the direction of obtaining higher yields of gas from the coal carbonised. But these higher yields were only obtained at the cost of producing a lower quality of gas, though they were justified by the fact that the multiple of quantity and quality, that is, the total heating capacity in the form of gas, was greater the higher the yield. Ultimately a standard quality for gas was fixed by the Board of Trade of 500 British thermal units per cubic foot; and in the early years of the war most large undertakings were supplying gas of this quality. The exigencies of war time, however, with its demand for more and more gaseous fuel for use in industry, necessitated the lowering of even this standard, and it was enacted that gas down to 450 B.Th.U. might be supplied before penalties should accrue. Thus opportunity was given and gas engineers were encouraged to stretch the production of gas to the utmost; and, strange as it seemed to many, it was found by experience that, however low the quality, the gas could be made to fulfil all the purposes required of it, if only it were supplied in sufficient quantity. Indeed, it is claimed in some quarters, and with a show of reason, that when the appliances for consuming gas are suitably adjusted for the quality of gas supplied, a higher efficiency is obtained with low quality gas than with high. At any rate, the quality of gas supplied in at least one large manufacturing town has been gradually brought down to 420 B.Th.U. with, it is said, increased satisfaction to the consumers.

The explanation of this apparent anomaly is simple, but it involves the consideration of some matters of fact which had been largely overlooked, even by gas engineers, until attention was forced upon them by persistent advocates of the claims of low-quality gas. Gas is now almost universally consumed through Bunsen or atmospheric burners. The use of direct flames, even for lighting purposes, is so insignificant in regard to the whole consumption that it may very well be disregarded. Now, with the Bunsen burner, what matters is the gas-air mixture which issues at the burner head; and it is a remarkable circumstance that, when the relationship between gas and air is properly proportioned for complete combustion, the composition of this mixture and its calorific value per cubic foot differ comparatively little, whether high or low-quality gas is being burnt. To take extreme examples, for instance, compare a gas of 360 B.Th.U. with one of 620 B.Th.U. The former requires 3·06 times its volume of air for complete combustion, and the latter 5·45 times. Therefore, dividing 360 by 4·06 and 620 by 6·45, we find the calorific value per cubic foot of the mixture to be 89 B.Th.U. in the one case, and 96 B.Th.U. in the other, or a difference of 8 per cent., whereas there is a difference of 73 per cent. in the calorific value of the gases themselves. When a proportionately increased amount of the lower quality gas is consumed (say, by enlarging the orifices at the burner) just the same result is obtained as if the higher quality were burnt, except that the temperature of combustion may be slightly affected, a matter which will be dealt with later. (The writer is ignoring engineering, as well as financial, questions, and is considering the subject solely from the chemical point of view.)

Present-Day Problems

We come now to present-day problems in gas manufacture and supply. To produce the increased supplies of gas demanded by war-time conditions, recourse was had to dilution of the coal gas, strictly so called, which is obtained when coal is carbonised in sound retorts or ovens. This was no new practice; but it had to be carried out on a larger scale. It is probably correct to say that no gas-making coal in common use yields an undiluted gas of less than about 550 B.Th.U. when carbonised at usual temperatures. In practice, it is diluted down to the quality aimed at, either more or less unavoidably by furnace gases introduced through cracks in the retorts, or by the admixture of a combustible gas of lower quality. The latter may be water gas, either produced in a separate plant or generated in the retorts themselves by the action of superheated steam on the mass of red-hot coke therein. Dilution with producer gas has been proposed, but not carried out to any extent. While producer gas might provide a cheap diluent, it is objected to because it introduces into the gas a large proportion of incombustible diluents or inert gases, and may thus reduce the flame temperature or intensity of combustion attainable. The degree in which this objection is valid will be investigated in an example later on.

It is generally recognised that gas could supplant coal with considerable advantage for practically every purpose if only it could be supplied cheaply enough. The experience of the last few years has proved that a much lower quality of gas than was formerly imagined can give entire satisfaction if it be rightly used. Then the new Act is calculated to encourage a spirit of adventure and enterprise in gas supply by allowing an undertaking to determine the quality of gas it will supply over a period of years, thus giving some liberty of adaptation

to local circumstances and opportunities. Important developments in gas manufacture and supply may, therefore, be looked for, taking diverse forms, but all tending in the direction of cheaper gas, for the problem of gas production from coal is being studied afresh, and there is possibly more than one solution.

Cheaper Gas?

Brief mention may be made of two of the schemes which have been brought prominently forward of late as promising to provide a cheaper supply of gas suitable for general distribution. They differ fundamentally in their general characteristics, and show, perhaps, two extreme lines of approach to the problem.

The first proposes to convert coal wholly into gas, instead of being satisfied, as at present, with a partial gasification and the production of valuable residuals in addition. A ton of coal has the potential value of 30 million B.Th.U.'s, equal to 300 "Therms"—the new unit of calorific value. In present-day practice the gas obtained from a ton of coal has a value of from 60 to 70 Therms, but along with it there are obtained for sale 9 or 10 cwt. of coke, besides valuable liquid by-products. The new process has, therefore, to show that its gaseous product (of something over 200 Therms value which is obtained at much lower cost), is economically more valuable than the total products of ordinary gas manufacture.

The second scheme, instead of destroying or avoiding the production of by-products, aims at conserving them to the utmost extent. Having in view the most economic conversion of coal into valuable products it would produce pure coal gas, less in quantity but of higher calorific value than is usual at present,, being satisfied with a total value of, say, 60 Therms, but along with this would obtain the highest available return in by-products. The rich gas would then be diluted down to a suitable quality for general distribution by means of producer gas. Producer gas is the cheapest form of gaseous fuel that is available, but as already mentioned, it is supposed to be unsuitable for distribution in admixture with coal gas in a public supply. It increases the proportion of "inerts" in the gas, and it reduces the flame temperature or temperature of combustion. As this matter of "inerts" has obtained of late more prominence than it really deserves, the following particulars have been worked out to show what is their actual effect in influencing the results of combustion. A sample of pure coal gas, with only 3 per cent. of unavoidable inerts, is compared with samples of mixed gas containing over 30 per cent. of inerts. The conclusions to which the figures point may be left for the reader to determine.

Analysis of Gases.

	Producer Gas. A per cent.	Producer Gas. B per cent.	Coal Gas. C per cent.	Mixed Gases. 50 p.c. A. 50 p.c. C. D per cent.	Mixed Gases. 60 p.c. B. 40 p.c. C. E per cent.
C_nH_m	—	—	4·0	2·0	1·6
CH_4	2·2	3·5	33·0	17·6	15·3
H_2	14·0	18·1	54·0	34·0	32·5
CO	23·0	28·8	6·0	14·5	19·7
CO_2	4·0	4·5	—	2·0	2·7
N_2	56·8	45·1	3·0	29·9	28·2
	100·0	100·0	100·0	100·0	100·0
Calorific value of gases per cubic foot.					
Gross	140	185	623	381	360
Net	130	172	556	343	325
Calorific value of gas-air mixture per cubic foot.					
Gross			96	89	89
Net			86	80	80
Gas and Air required to develop 1 Therm (100,000 B.Th.U.).			Cub. ft.	Cub. ft.	Cub. ft.
Gas			161	262	278
Air			877	859	850
			1,038	1,121	1,128
Products of Combustion.			Cub. ft.	Cub. ft.	Cub. ft.
CO_2			83	106	118
H_2O			215	200	191
N_2			708	771	762
			1,006	1,077	1,071
Theoretical flame temperature or temperature of combustion—			1,950°C.	1,865°C.	1,865°C.

British Association of Chemists

To the Editor of THE CHEMICAL AGE.

SIR,—In reply to the remarks of your anonymous contributor to your last issue I will confine myself primarily to answering the statements made regarding the association with which I am concerned—namely, the British Association of Chemists.

If my learned friend is sincere in his conceivably reasonable wish to join a union, it is to be regretted that he did not seek his information from the headquarters of the associations in question instead of committing himself to print on the unsupported authority of hearsay evidence.

An old tag has it that "half truth is no truth," and in gathering his information your contributor evidently did not seek to inquire as to the details of the "sufficient standard of education" *laid down* (not "*as interpreted*") by the Nominations Committee, before generalising on the subject.

The minimum qualifications for membership of the British Association of Chemists were laid down at a meeting of the Nominations Committee held on August 24, 1918, and are sufficiently stringent to secure a high standard of membership. These qualifications have been rigidly maintained on all occasions, and no applicant whose qualifications did not come up to the required standard has ever been admitted to full membership of the association.

It is inconveivable upon what evidence, observing that no statistics have ever been published, the statements that appear in the latter part of this paragraph are made, particularly as they are entirely erroneous.

It may, or may not, be correct that a "considerable number" of our members, certainly not the majority as is implied by your contributor, do not possess any university degree, but in each case where the degree is not held the member is holding a responsible position in the chemical industry.

Every chemist who is a member of the British Association of Chemists holds a *professional* qualification, whether it consists of a university or other degree or has been gained by personal experience.

The admission of competent men having at least seven years' practical experience is expressly framed to admit, for the time being, men holding responsible positions in the chemical industry who have not had the advantages of a university training.

In his new era of the chemical profession your contributor apparently has no use for the man who has qualified by experience, and, perhaps, has held the post of works manager, chief chemist or head of research laboratory for 10 to 20 years. He is to be segregated with the "skilled worker" (*i.e.*, routine tester?) and the "apprentice," because he does not possess "the only recognised professional hallmark." No mention is made of the various universities under the scheme; apparently they are incapable of conferring the "hallmark."

The future organisation of the chemical industry is receiving the earnest attention of the Council of the association, and in the preparation of schemes to this end the urgent need for unanimity within the profession has not been lost sight of. This can best be obtained by co-ordinating the work of the existing bodies and not by the efforts of individual units. The B.A.C. has long since passed the stage of pious hopes, which do nothing practical to further the interests of chemists.

In conclusion, may I extend a hearty invitation to your contributor to attend a meeting of the nearest Section where he may hear how it is proposed that the "seductive delights" may be attained.—I am, &c.,

A. STEWART MILLS, Asst. Secretary,
British Association of Chemists.

Bedford House, 8, York Place, W. 1.
August 11, 1920.

China Clay Exports.

CHINA CLAY exports have been small during the last few years, compared with pre-war quantities. The exports for 1913 were 629,703 tons, and these declined to 232,464 tons in 1918. Since the armistice, however, there has been a satisfactory improvement in the figures: 286,543 tons were exported in 1919, and 211,636 tons for the first six months of 1920. It is hoped that an improvement in transport facilities will accelerate this satisfactory rate of progress.

Industrial Chemists' Association

Report for the past Half Year

At the Council meeting of the National Association of Industrial Chemists, held at Sheffield, on Saturday, August 7th, among other important business transacted was the reading of the Hon. Secretary's report, from which we note that since the last meeting of the National Council on February 7th, the Hon. Secretary and the Asst. Secretary have devoted a large amount of time and thought to the affairs of the Association.

One particularly interesting part of the correspondence has been in helping a number of members with various technical and professional problems, the best course of procedure in connection with certain matters of professional conduct, change of occupation, and courses of study. In a number of other instances advice was asked on a number of entirely confidential matters, and in most of these cases the members concerned have written expressing their gratitude for the assistance rendered.

Salaries and Conditions

Considerable attention has been given to improving the status and salaries of members and definite arrangements made whereby a considerable number of firms have agreed to consult the Association's officials when requiring fresh chemists and in the event of disputes between them and their chemical staff. In a number of other instances employers have been advised to increase the salaries of some of their chemists, and whilst they have not always granted the increases suggested they have, in every instance, made a substantial advance. Increases in the salaries of Associate Members have been more difficult to secure; the maximum advance to any Associate was a sum of 9s. per week.

A strike occurred at a large and well-known firm of chemical manufacturers in which the chemists were involved. Although these chemists went on strike without the sanction of the Association, the manager of the firm willingly agreed to accept the Association's offer to act as mediator, and the strike was rapidly settled and substantial increases in salary were paid.

One of the most successful accomplishments of the past half-year has been the receipt of definite undertakings from a number of firms to consult the officials of the Association in all matters relating to chemists including the appointment of new men, the salaries to be paid and the hours and conditions of work. The list of firms giving such an undertaking is being extended as rapidly as possible.

On the whole, the salaries now paid to most of the members of the Association appear to be fairly satisfactory, and wherever dissatisfaction is felt the officials are always glad to do what they can to ensure an adequate salary being paid.

The whole subject of salaries is, however, an extremely difficult one, and only those actually engaged in the correspondence and personal visits which are necessary in endeavouring to secure an advance, can have any idea of the amount of work, thought and diplomacy involved.

A Committee of the Association has issued a report giving a schedule of minimum salaries for chemists of various ages, and full particulars of this will shortly be sent to all members.

As regards Income Tax, a number of minor concessions has been obtained.

Co-operative Action

The President and Hon. Secretary are both members of the Executive of the Federation of Technical and Scientific Professional Associations and have attended all the meetings. Another federation with a much larger scope having been formed, and some of the Associations federated to the former one having seceded, it has become somewhat dormant, but it is hoped to revive it during the coming winter. The apathy and instability of many of the members of the Federation have made its work peculiarly difficult and much of it has failed in effectiveness through the lack of support of the constituent associations.

Among other organisations, the British Association of Chemists have been in touch with this Association throughout the past year, and various schemes for co-operation are under consideration, though nothing definite has yet been settled.

At the present time this Association is the only registered Trade Union for analytical chemists.

The Future Outlook

The future outlook for many industrial chemists is distinctly discouraging. There is evidently a great slump coming in the engineering and allied industries in which chemists are chiefly employed. The number of unemployed chemists is increasing very rapidly and unless they are sufficiently united, little can be done to help them. Just at a time when other Trade Unions are concentrating more than ever on unity of action, many chemists are weakening their cause and damaging their position and prospects by an apathy which is almost indescribable.

If the Association is to justify all the work which has been devoted to it by its various officials, it is imperative that a larger number of members should shoulder their individual responsibilities and so enable the Council to secure the requisite co-operation of all the members with the officials of the Association.

With the ever-increasing combinations of employers and workers, it has become more than ever necessary for all industrial chemists to unite to preserve their own interests. Never was their a better opportunity than the present for chemists to make their influence felt yet this opportunity will be missed unless they work together, and the officials of the Association are at all times pleased to have suggestions and reports from members whereby the interests of the Association may be still further secured.

At the same meeting Mr. A. B. Searle (Sheffield) was unanimously elected as President of the Association, whilst Mr J. W. Merchant was appointed Secretary.

In order to cope with the large amount of propaganda work required, which cannot be undertaken by the present secretariat on account of the pressure of the other secretarial work of the Association, it is proposed to appoint an organising secretary at a salary of at least £400 a year; applications for this post should be sent to Mr. A. B. Searle, The White Building, Sheffield, before September 30th.

Review

DICTIONARY OF EXPLOSIVES. By A. Marshall. London; J. & A. Churchill. Pp. 159. 15s. net.

The grief of the Walrus and the Carpenter at the sand vision could not have been more intense than that experienced by your reviewer, not at the sight of another dictionary of explosives as such, but at the waste of energy in the making of scores of mixtures supposed to or intended to explode in some particular and special way different from any other person's stuff. It might have been imagined that given a knowledge of the requirements of explosive users such as a War Department, miners in coal and other minerals, quarries and earthy materials, engineering problems either on land or under water, it would not have been an insuperably difficult problem for a few real chemists to modify and regulate some of the best known common explosives, so as to fit them for fiery mines and the like and for other positions and materials, while keeping an eye on the breathing requirements of the users as well. Looking at this long list of mixtures, many differing but little from their neighbours, the question arises—Has the real chemist had much of a hand in compiling these many imposingly named "ites"? Presumably not. The real chemist, on studying some of the compositions, must think that that condition associated with a little knowledge was closely approached by the compounders in a good many instances, if not actually reached.

Well, there is no end of book making and the compiler of this has done his work well. For many users of explosives it will be distinctly valuable, not only because of the details of composition, but of the short notes as to "permitted" or not, on "permission withdrawn," which are quite good to know, and the power, where known, or ballistic pendulum and limit charge.

An excellent arrangement is an index of constituents, so that on looking, for instance, for the use of the potato meal or like substance in explosive, one finds that at least six different compositions contain it, and so on. There is also a classification of coal mine explosives, blasting powders, high explosives, propellants, &c. Both author and publishers are to be congratulated on the production of the dictionary.

W. R. H.

The Nitrate Outlook

Restricted Selling attributed to Uncertainty regarding Output

MESSRS. HENRY BATH & SON, in their monthly review of the Nitrate Market, state that the tone has been steady, with comparatively few transactions. After its large sales in June and the early part of July, the Nitrate Producers' Association practically withdrew from the market and made only such sales of July at 15s. 6d. and August at 15s. 11d. per quintal as were required by the exigencies of tonnage for early loading, this abstention from selling being largely due to the uncertainty which prevailed regarding output.

The fears which have been expressed that a shortage of fuel and faulty transport facilities would bring about a diminished production were later augmented by news concerning the political situation in Chile. These fears, however, have to a certain extent been minimised by the action of the association in offering to sell 100,000 tons August, 60,000 tons September and 50,000 tons monthly October to April at the unchanged prices of 15s. 11d. for August, 16s. 6d. September, 16s. 10d. October, 17s. 1d. November, 17s. 3d. December-March and 17s. April, per quintal f.a.s. It remains to be seen whether, at this juncture, the association will actually deem it prudent to dispose completely of these quantities, even if given the opportunity, but for the time being, at any rate, the contrast between the unexpected offer of the large quantity mentioned and the supposition that the association would think it wiser to hold off the market for some time to come, has been enough to check any development towards an improvement in prices.

During the last month a large number of the German sailing vessels which have laid idle in Chile for the past six years were chartered to load nitrate for United Kingdom-Continent at about 96s. per ton. These fixtures occasioned a certain amount of buying of early nitrate both from the association and out of second hands, the latter selling July shipment from 15s. 4½d. to 15s. 10½d. per quintal f.a.s. Business in later deliveries f.o.b. has been neglected. Monthly deliveries all over 1921 are valued at 16s. to 16s. 3d., while the whole of 1922 is probably obtainable out of second hands at about 14s. 3d. per quintal. The various strikes at the nitrate ports are ended, and work has been resumed pending the result of a Government inquiry into labour conditions there.

One or two sailing vessel cargoes for September-October shipment are reported sold at prices ranging from 23s. 6d. to 23s. 9d. per cwt. c.i.f., while steamer cargoes for October-December shipment for the Bordeaux-Hamburg range are valued at about 23s. 9d. to 24s. per cwt. c.i.f., though no fresh transactions in these are reported. Prompt shipment by steamer is offering for picked Continental ports at 22s. 9d., and by liner to United Kingdom at 22s. per cwt. c.i.f. As is usual at this time of year the demand for spot nitrate in Continental consuming markets is small and only moderate quantities are being sold at the parity of about 21s. 6d. per cwt. c.i.f. Continental exchanges have been adversely affected by International politics and a resumption of free dealings in next spring's delivery has been hindered. Freights have been rather more active on owners showing some readiness to meet the market. The nearest quotation at the close for October-December loading is 100s. for the Bordeaux-Hamburg range, with Spanish Atlantic and Mediterranean respectively about 10s. and 20s. per ton higher.

July Statistics

Messrs. Thomson Aikman, jun., issue the following statistics relating to nitrate of soda for July :—

	1920	1919.	1913.
Shipments to Europe and Egypt	70,000	7,000	107,000
Shipments to United States	64,000	8,000	41,000
Shipments to Japan and other countries	6,000	5,000	13,000
Loading at Aug. 1 for Europe & Egypt	47,000	18,000	97,000
Loading at Aug. 1 for United States....	24,000	7,000	15,000
Loading at Aug. 1 for Japan and other countries	—	8,000	—
Production in July	210,000	115,000	240,000

The summary of the position at July 31 is thus altered as follows :—

	1920.	1919.	1913.
Visible supply for Europe and Egypt...	344,000	140,000	430,000
Visible supply for United States.....	115,000	27,000	83,000
Visible supply for Japan and other countries	21,000	18,000	15,000
Stocks in Chile	1,326,000	1,595,000	685,000
Total supply in sight at July 31	1,806,000	1,780,000	1,213,000

Since August 4 the market has been quiet, and no transactions are reported in cargoes. A fair quantity of prompt f.o.b. is reported to have changed hands on resale at 15s. 9d. to 15s. 11d. per quintal, but no further sales by the Producers' Association are announced. Freights are quiet at about 100s. per ton for Bordeaux-Hamburg range.

Chemical Workers' Wages

Gateshead Men's Claims not Established

THE decision of the Industrial Court in respect of the claim for an advance in wages made by the National Amalgamated Union of Labour on behalf of the members of the union employed by the United Alkali Company, Ltd., Gateshead, is that, subject to certain observations, the Court finds that the claims as submitted have not been established. The application was as follows :—

1. For men employed at the high marks mechanical bleach plant, a rate of 18s. per shift for top men, bottom men and lime men, and 2s. per hour for greaser men.

2. For men employed on the electrical soda plant who are looking after the series in the cell room, a wage of 16s. per shift and an extra man.

In the observations which accompany the decisions the Court stated that the men concerned had received advances corresponding to all those given in the engineering and foundry trades, including the 12½ per cent. on earnings and the recent advances dating from April 1 and June 1, 1920. The recent advances were advances in base rates and not advances given on account of increases in the cost of living. Those advances had been received by the men concerned in the claim, and to that extent they must be considered as having received the quivalent of an advance in base wages.

The claim was based to a large extent on the character of the work, and the Court was of the view that the rates of wages now paid take account of the general character of the work, which is necessarily unpleasant. In so far, however, as risks of accident or inhalation can be minimised by improved equipment and staff arrangements, the Court considers that such improvements should be made and that an increase in wages should not be regarded as a satisfactory alternative.

The British Association

Chemical Section at Cardiff

WE have been able, through the kindness of the Association, to secure the following particulars of the Chemical Section (B), at the annual meeting of the British Association, which opens at Cardiff on the 24th of this month. Details of the exact proceedings will be announced daily in the Reception Room, and will be posted outside the Section Meeting Room :—

Tuesday, 24th.—9.30 a.m. Committee ; 11 a.m., address by the President (Mr. C. T. Haycock) ; Noon, Capt. A. Desborough on "Industrial Alcohol."

Wednesday, 25th.—9.30 a.m., Committee ; 10.30 a.m., papers and discussion on "Lubrication." It is expected that the following, among others, will take part : A. E. Dunstan H. M. Wells, J. E. Southcombe, and W. C. McLewis.

Thursday, 26th.—9.30 a.m., Committee ; 10 a.m., papers on "The Metallurgy of Tungsten and Zinc." It is expected that Sir R. Hadfield, S. Field, and J. L. F. Vogel will speak ; Noon, Report of the Fuel Economy Committee, and discussion thereon.

Friday, 27th.—9.30 a.m., Committee ; 10.30 a.m., papers and discussion on "Isotopic Elements." Sir E. Rutherford and Professor F. Soddy will probably take part.

Chemical Research in India

Work of the Board of Scientific Advice

THE work of the Board for Chemical and Industrial Research and Scientific Advice was referred to by Mr. P. Raghavendra Rao (chairman) at the recent Mysore Economic Conference. Last year, he said, the Board had only been in existence three months and it was impossible to say what work had been achieved, and even now it was difficult to state that much had been accomplished, because in the matter of scientific research and advancement progress was necessarily slow, but the following had been carefully considered :—

(1) *The Manufacture of Chrome Products.*—After careful investigation, this was given up, as not being a commercial proposition.

(2) *The Manufacture of Electrolytic Alkali and Bleaching Powder.*—These were carefully considered and a recommendation to the Government was made, but, owing to the financial stringency, the Government desired that the matter should lie over for the present.

(3) *The Manufacture of Essential Oils.*—Certain experiments were conducted, but, since the formation of the Mysore Development Syndicate (for the same purpose) not much work had been done in this line.

(4) *The Manufacture of Industrial Alcohol from Mowha Flowers.*—This was an important question at present in view of the petrol problem. The Mowha flower is found in Mysore State, and certain experiments are being conducted in the laboratory of the Agricultural Department. Experiments were conducted in the Nizam's Dominions, and the results of the investigation were very encouraging. The difficulty is that the Mowha flowers cannot be had all the year round. The season is once in two years (for a bumper crop). It should be preserved in such a manner in the season that its sugar contents do not deteriorate. If the sugar contents disappear, it is not worth while manufacturing industrial alcohol from the flower. That is the point receiving investigation at present.

(5) *The Manufacture of Optical Glass.*—A certain kind of quartz was found near Bangalore, and specimens were put before the Scientific Board and the matter was discussed. But as optical glass is not manufactured in any part of India, it was found necessary to send the samples to optical glass manufacturers in England, and inquiries are being made as to their suitability.

(6) *The Manufacture of Citric Acid from Lemon Juice.*—The experiments conducted so far have been encouraging, but it has not been possible to undertake manufacture on a large scale.

The manufacture of tannin extract, the manufacture of sulphuric acid, which is one of the biggest problems, the problem of utilising the by-products of wood distillation, and the preparation of lac and varnish, are receiving the careful attention of the Board.

British Glassware Trade Prospects

THE immediate outlook in the trade is on the whole satisfactory, since the weather, which has been rather abnormal for the time of the year, has not had its usual effect of lowering production. Moreover, the introduction of machinery is becoming more general, and the inevitable result is an increase in production. One firm hopes in the near future to double an output of electric bulbs, which is already well over 12 millions, and another dealing in tumblers and bottles to the extent of 170 millions per annum has decided to treble that figure. The greatest difficulty confronting makers is the lack of potash. The substitutes for German potash, which is practically unobtainable, have proved unsatisfactory, and the same is true of Russian potash, which is said to leave a copper tint in the glass. Government aid has been repeatedly sought on this question, but little or no relief seems forthcoming.

The quarter from which the most serious competition may be expected in the future promises to be Japan. In 1918 upwards of 200 factories were erected there, and the conditions of cheap labour, accessible potash, and industrial enthusiasm have already done so much for the trade that Japanese bottleware is practically the only variety on the New Zealand markets. The large number of glass factories which have sprung up in the London district alone is a satisfactory sign that the trade in this country is keen, but until some solution of the potash trouble is found British manufacture must be subject to a serious handicap.

The Affairs of Oakley, Sollas & Co.

Statutory Meetings of Creditors

STATUTORY meetings of creditors and shareholders in the compulsory liquidation of Oakley, Sollas & Co. (Ltd.), shippers and merchants, 52, Gracechurch-street, E.C., were held on August 10 at the Board of Trade Offices, 33, Carey-street, London. Mr. E. T. A. Phillips, Assistant Official Receiver, presided.

A statement of the company's affairs showed unsecured liabilities £79,216, and no assets were disclosed to meet these claims. The company's assets, which had been realised by a receiver for debentureholders, were returned a £4,461, but they were all required to meet in part the claims of the debentureholders amounting to £14,500. The total deficiency as regards both creditors and shareholders was estimated at £80,318.

The Assistant Official Receiver reported that the winding-up order was made as long ago as May 13, 1919, and the delay in convening the meetings was due entirely to the default of the directors in filing the statement of affairs. The company was formed on April 1, 1913, to acquire from Mr. Samuel Wesley Oakley, a business of shipbrokers, ship owners and general traders. The promoters were Mr. Oakley and Mr. Ernest Henry Sollas, who were the first directors. The company did not, however, confine itself to the shipping business, but in 1915 started a chemical business on joint account with Georges Zeyen, a Belgian subject. The finances were to be provided by the company, and the profits equally divided. By March 31, 1917, there was a debit balance of £10,775 on the account of which £3,000 was then written off against profit and loss, and £7,775 carried forward. Zeyen joined the Belgian army in 1917, and according to the books the ultimate loss on the joint account was £6,873. Of this sum only £1,936 appeared to have been charged against Zeyen, and was shown in the statement of affairs as a bad debt. After Zeyen joined the army, the chemical business was continued by the company. Three awards were given against the company in connection with the supply of soap amounting in the aggregate to £20,402, none of which appeared to have been satisfied by the company. The total loss on the chemical and soap departments amounted to £31,535. A further loss of £3,569 was incurred in connection with the sale of soft goods under the style of the Rose Syndicate. The failure of the company was attributed to restrictions on shipping, railway wagons and the export of coal and general merchandise.

The Assistant Official Receiver added that there were several matters arising out of the liquidation which would require very careful consideration. There was the question of the remuneration of the directors, and the issue to Messrs. Oakley & Sollas of debentures in respect of a consideration which very possibly did not exist. He invited the creditors to nominate a committee of inspection to confer with the Official Receiver on these points.

The liquidation was left in the hands of the Official Receiver.

German Debts

IT is clear from the replies of Sir Robert Horne to questions in Parliament this week that the date of repayment by German firms of debts owed in this country is governed by the provisions of the Peace Treaty. British creditors had been given up to July 12 to file notice of the debts due to them, and a large proportion of their claims had not been put into the British Clearing Office until recently. Some 30,000 claims had been notified to the German Clearing Office immediately on its formal establishment in May (May 15), and others were being notified monthly. Under the Treaty the German office had three months in which to admit or object to them.

In reply to Mr. A. T. Davies, Sir Robert Horne stated that notice of the admission by Germany of British debts to the amount of nearly £200,000 had now been received, and these would be paid by the British Clearing Office during this month. A letter sent by Sir Robert Horne from the Board of Trade to Major Breese gives the explanation received from the German Controller of the delay of his office in expediting the admission of British claims. This is explained on the grounds of staff difficulties, novelty and volume of the work, and so forth. Sir Robert Horne states that the Controller of the Clearing Office is putting continuous pressure on the German office, and adds that until the time limit has expired no diplomatic action can be taken.

Fertilisers for South Africa

THE South African Union Department of Agriculture, in a Memorandum reviewing the requirements of the agricultural industry show the extent to which South Africa is dependent on foreign countries for supplies of fertilisers, and the shortage experienced during the war by the shipping difficulties.

With the exception of about 6,000 tons Government guano per annum and a certain amount of bone manure, the Union was entirely dependent upon countries oversea for its supplies of artificial fertilisers. Phosphatic fertilisers were obtained almost entirely from Great Britain and the continent of Europe, and when war broke out these sources of supply were closed. Efforts were made to obtain supplies from the United States of America and Japan, but none were to be had except at prohibitive prices. At the same time the possibility of local production received earnest attention, but no new supplies of importance were disclosed. The position in the Union was acute, and bones and other materials were used to the utmost. No effort was spared by the Department of Agriculture to assist merchants to obtain fertilisers for sale; and a deposit of phosphatic guano at Cape Cross, in the South-Western Protectorate, formerly German South-West Africa, estimated at 4,000 tons, was purchased by the Government for re-sale to farmers. Owing to shipping difficulties, only 737 tons had come to hand at the end of March, 1918; the tota quantity sold and delivered at the end of 1919 was 3,826 tons. The position at the end of 1919, though still abnormal, was becoming easier, fairly large consignments of super-phosphate and basic slag coming in. Prices were still ruling high. It is estimated that the Union requires annually about 35,000 tons superphosphate and 10,000 tons basic slag, with the prospect of steadily increasing requirements, and supplies are much below this figure; the imports of manures and fertilisers for the year 1919 amounted to only 12,617 short tons.

The following figures of the imports for the 10 years 1909 to 1918, taking into account enhanced costs caused by the war, show the extent to which oversea supplies diminished:—

Imports of Fertilisers (Tons of 2,000 lb.).

Year.	Basic Slag.	Bone Manure.	Guano.	Nitrate of Soda.	Potash Manures.	Sulphate of Ammonia.	Phos-Phosphates.	Super-phosphates.	Phosphates raw.	All other N.O.D.
1909	—	—	691	—	—	—	15,462	—	—	7,863
1910	—	2,189	366	—	—	—	23,724	—	—	7,331
1911	—	2,638	875	—	—	—	25,443	—	—	7,492
1912	—	3,445	456	—	—	—	32,616	—	—	6,366
1913	5,970	4,714	351	73	1,997	400	—	41,013	8,585	761
1914	6,832	4,400	1,128	25	713	231	—	36,836	377	9,105
1915	9,027	2,019	726	—	31	67	—	33,911	—	6,548
1916	6,231	143	19	1½	—	50	—	20,000	—	3,943
1917	636	409	315	—	11	47	—	6,958	—	701
1918	—	3,361	580	—	—	—	—	6,792	5,056	779

German Fuel Experiments

DETAILS of Germany's experiments in developing liquid fuel to preserve existing industries and to maintain railway transport facilities, are contained in a United States Consular Commerce report. In the opinion of some leading engineers, states the report, this can be best accomplished by submitting the bulk of the coal to a special process of low temperature distillation, and then using the liquid fuel so obtained in Diesel engines to secure the bulk of the power required. This method, it is contended, would have the additional advantage of yielding by-products of great value.

As a result of a great deal of experimental work conducted during the blockade, Germany is now producing a considerable quantity of liquid fuel and allied products by this method. It gives a tar of essentially different composition and properties from the coal tar obtained in the ordinary process of coke and gas manufacture, and with the distillation conducted at a temperature of 800°F., instead of 1,800°F., there is much greater yield of tar, although the yield of gas is less. The "coalite" or half coke thus produced is intermediate in quality between coal and coke. It is suitable for use in steam engines and for household purposes. The tar produced by this process is fractionally distilled in the ordinary way, yielding benzines, lighting oils and various grades of lubricating oils.

"The advantages of fuel oils for the production of power in stationary and marine engines have been demonstrated, and there is promise of even greater advantages to be derived from their use in locomotives," adds the report. "In Germany any marked increase in the use of oil-burning engines will, of necessity, go hand in hand with the increased production of oils derived from coal."

THE EXTRA PHARMACOPŒIA, Vol. I. By W. H. Martindale and W. Wynn Westcott. H. K. Lewis & Co. 27s. net.

The previous edition of this useful reference work was issued in 1915, so that the long interval which has since elapsed has called for wholesale revision. The book deals mainly with chemical substances from a medical and pharmaceutical standpoint; but although of primary utility to the druggist, it contains a host of information which, if not directly useful to the chemist in his everyday work, provides most interesting reading. It is the kind of book to which one would turn for information regarding abstruse synthetic products, while many of the tables of equivalents and arithmetical memoranda are in handy form.

British Dyes for Brazil

THE exportation of Brazil's staple products was for many years largely handled by German firms, who gained from this partial control a strong position, from which they have not been completely dislodged. The success of Great Britain's future in the commercial world there seems to depend upon our vigorous participation in the internal development of the country. British enterprise has already surmounted many difficulties and about £200,000,000 of British capital is already invested there, mainly in public utility concerns. The Brazilian market for aniline dyes before the outbreak of war was supplied almost exclusively from Germany. Considerable quantities were subsequently received from the United States. The vigorous efforts in the United Kingdom of late have made it possible for British dyes to be supplied to this market. The British Dyestuffs Corporation, Ltd., are represented in Brazil by a British firm, and if continued efforts are made by all concerned the future trade in aniline dyes from Great Britain to Brazil should assume important proportions.

The Affairs of John de Lysle

AT the first meeting of the creditors of John De Lysle, 47-8, Berners Street, Oxford Street, W., held on Thursday, July 29, at the London Bankruptcy Court before Mr. W. P. Bowyer, Official Receiver, the debtor was neither present nor represented, and is believed to have departed for Paris by way of aeroplane.

Having dealt with proofs of debt amounting to £2,500, the chairman reported that the debtor attended at the department when the receiving order was made and stated that since 1918 he had traded as a manufacturer of chemical perfumes and toilet requisites, and had acted as promoter, director, vendor or otherwise of a number of companies, including the Lysle Distributing Agency, Ltd., Lysle Export and Import Co., Ltd., Lylco, Ltd., and De Lysle Motor Co. He roughly estimated his liabilities at £5,000, and did not admit insolvency, for the reason that he had plenty of assets, including shares in the various companies, but could not turn them into cash at a moment's notice.

A resolution was passed for Mr. F. P. Salaman, C.A., to act as trustee and administer the estate in bankruptcy.

From Week to Week

Damage estimated at £30,000 has been caused by a fire at the works of the Grays Dyes & Chemicals Co., Grays, Essex.

DR. L. A. JORDAN, who was recently created Chevalier of the Order of the Crown of Italy for war services rendered, has been awarded the degree of D.Sc. in chemistry by the Senate of the University of London.

The Department of Overseas Trade has issued a report on the economic, financial and industrial conditions of Holland for the year 1919 by Mr. R. V. Laming, Commercial Secretary to H.M. Legation, The Hague.

The Annual Report of H.M. Inspectors of Explosives for the year 1919 was issued this week. It records as a most satisfactory feature a great decrease in the total number of accidents, and of persons killed in manufacture.

The death is announced of PROFESSOR EDWARD KINCH, formerly Professor of Chemistry at the Royal Agricultural College, Cirencester, at the age of 71. He was at one time Professor of Chemistry at the Imperial College of Agriculture, Tokio, and Superintendent of Minerals at the India Museum.

It is unofficially reported that Messrs. Lever Brothers have purchased £300,000 of debentures of the Tin Areas of Nigeria, but inquiries at the company's offices are informed that it can be neither confirmed nor denied, as the name of the firm with which negotiations are in progress have not been disclosed. It is hoped that an official statement will be made within a few days.

An extraordinary general meeting of the Society of Chemical Industry was held at Central House, Finsbury Square, London, on Monday last. Sir W. J. Pope presided. The only business was in relation to the revised by-laws adopted by the Society at the annual meeting at Newcastle-on-Tyne. The adoption of these by-laws was unanimously confirmed. About 30 members were present.

Following the recent announcement of a working alliance between Messrs. Boots Pure Drug Co. and the American United Drug Co., comes the confirmed statement that Sir Jesse Boot, Bart., has resigned his position of managing director of Boots Pure Drug Co. in favour of Mr. G. M. Gales, who is president of the American United Drug Co. Sir Jesse, who is continuing as chairman of the board of directors, is 70 years of age.

At the Norwegian Industries Fair to be held at Christiania from September 5 to 12, there will be sections including chemical and pharmaceutical articles, oils and colours, minerals and metals, and new Norwegian patents and inventions. The electro-chemical and electro-metallurgical industries of Norway have made great advances of late, and in these branches, as well as in that relating to cellulose, English visitors may find much to interest them.

Ten thousand gallons of petrol were destroyed by a fire which broke out on Friday, August 6, at the ANGLO-AMERICAN OIL CO.'S depot, at Bromley, Kent. The firemen, who were eight hours fighting the flames, prevented the fire from spreading to an underground storage tank filled with 8,000 gallons of petrol. The depot is situated near the north station of the S.E. & C. Railway, and the cause of the outbreak, it is supposed, was a spark from an engine.

At the monthly meeting of the Newcastle branch of the PHARMACISTS AND CHEMISTS SECTION of the National Warehouse and General Workers' Union, it was stated that the membership of the Union on the Tyne alone exceeded 300, and that applications were still coming in from the North-Eastern counties. The advisability of amalgamation with the Skinner's Drug Union, was discussed, and it was agreed that amalgamation would make them a more representative and effective force.

Four reports, constituting part of the digest of information on the MINERAL INDUSTRY OF THE BRITISH EMPIRE and foreign countries for the period 1913-1919, have been issued by the Imperial Mineral Resources Bureau, and cover the subjects of arsenic, fullers earth, magnesite, and chrome ore and chromium. The publication of the general report of the Chief Inspector of Mines ceased after the year 1912, and the Bureau is devoting itself to completing the gap in the statistical information. It is proposed to issue each report as it is completed.

A large party of the Southport and District Grocers' Association paid a visit this week to the factory of the PLANTERS' MARGARINE COMPANY, at Bromborough, and were shown through all departments. They saw the process of manufacture of both butter and margarine, the latter from the initial mixing of the milk and oils, to its packing and despatch. For transport the company have their own roofed railway station, with several platforms from which the material is run in the company's trains on their own lines, which connect up with the Port Sunlight system a couple of miles away. The factory is being greatly enlarged, and the second unit having been practically completed, a third huge building is being started.

The BRITISH INDUSTRIES FAIR, to be held between February 21 and March 4 next year, is being arranged by the Department of Overseas Trade and will take place at the White City. Every effort will be made to tempt foreign buyers to attend. An illustrated brochure will be issued in ten different languages, explaining the various exhibits and supplying information of use to intending purchasers. The fair will be a purely business enterprise, and the general public will be excluded. Simultaneously, similar fairs will be held in Birmingham and Glasgow. Information respecting the fair will be forwarded to all foreign Consuls in the course of a few days in order that intending visitors in all parts of the world may secure particulars from the resident Consuls.

According to Berlin advices large OIL COMPANIES are being formed in Roumania. The new undertakings referred to are the Industrie Roumana de Petrol, with a capital of 100,000,000 lei; Petrolina, 25,000,000 lei; and Neptun, 15,000,000 lei. In the first named it is stated that only Roumanian capital is concerned, and it is assumed that it is the intention of the founders that this company shall participate in the exploitation of the State oil lands and in the taking over of the late enemy-owned oil undertakings. The report adds that the Petrolina is a company in which English, French and Belgian capital of the "Shell" group is interested, whilst the capital of the Neptun company is apparently being furnished by French and Belgian interests, the main objects in both cases being the consolidation of various small concerns hitherto in Roumanian hands. That the English oil men are equally alive to the possibilities of the Roumanian Oilfields is evidenced by the organisation of the Phœnix Oil & Transport Co., Ltd., with a capital of £2,050,000, of which an issue has been made of £550,000, and has been guaranteed for working capital, and £1,000,000 is being held in reserve for further developments, while the board includes the chairman of the Scottish-American Oil & Transport Co., Ltd., and of Tankers, Ltd.

The new iron ore mines and plant of the Ebbw Vale Steel, Iron & Coal Co., Ltd., at Irthlingborough, Northants, were opened on Wednesday by Lord Ashfield. The company have acquired an estate of about 3,000 acres in Northamptonshire, the major portion of which has been proved by trial pits and bore-holes, and the existence of a bed of iron ore, 15 ft. in thickness, has been demonstrated. The ore available in the area is estimated at 45,000,000 tons, and the mine has been laid out to deal with a minimum daily output of 2,000 tons. It is developed by means of a tunnel approximately 1,000 yards in length, entering at the extreme southern end of the property. The tunnel is 14 ft. in diameter, and is bricked throughout. It is arranged with a falling gradient, and serves as the drainage water outlet for the mine. The mine trams, each carrying three tons of ore, are brought from the working places in the galleries beyond the tunnel by tractors to collecting sidings, and are worked out from the tunnel to the calcining plant by electric locomotives. The calcining plant is in close proximity to the discharge outlet of the mine, and the kilns are 16 in number. The equipment of the plant is electrical throughout. Mr. Frederick Mills (chairman of the company) conducted an inspection party over the works, among those present being Lord Ashfield. At the entrance to the tunnel a gold key was presented by the chairman to Lord Ashfield, who, in unlocking the gate, expressed the hope that the production of the mine would play an ever-increasing part in the trade markets of the world.

American Notes

Professor H. A. Bumstead

Professor H. A. Bumstead, director of the Sloane Physical Laboratory, Yale University, has been elected chairman of the National Research Council for the year beginning July 1.

Chemical Warfare Service

This branch of the American army has been declared permanent by the Army Reorganisation Bill. The present provision is for 100 officers and 1,200 men, headed by a Brigadier-General.

British Units in War Department

The Secretary of War has ordered the British Units of Weight and Measure to be used in future in connection with military subjects. The order, however, is not to be construed to prevent the use of the metric system when desirable, in connection with specifications and contracts, medical and scientific supplies, scientific research and developments, foreign maps, and similar subjects.

Pyrometric Practice

The Bureau of Standards is about to contribute an exhaustive treatise to the literature of pyrometry. The paper, which will be available in about six months, is to deal with the present state of the science, the instruments and methods used, and illustrate some of the industrial applications of the art. It is to consist of about 300 pages, with a large number of illustrations, and will be obtainable at cost from the Superintendent of Documents.

Chemical Merger

We learn from American journals that negotiations for a merger of several large by-product and chemical factories are progressing satisfactorily. The plan evidently involves the merger of the General Chemical Co., the Barrett Co., Semet-Solvay Co. and National Aniline Co. The aggregate earnings of the companies to be included in the merger are said to be about $30,000,000 annually, of which the National Aniline contributes about $12,000,000.

American Institute

The Canadian members of the American Institute of Chemical Engineers held their twelfth semi-annual meeting at Montreal from June 26 to July 5. The Meeting Committee reported that New Orleans and Detroit had invited the society, and it was tentatively decided to hold the December meeting at the latter. Visits were arranged to the leading Canadian chemical plants in the vicinity of Montreal, Ottowa, Belleville, Shawinigan, Falls and La Tuque; and the institute medal was awarded to H. K. Moore for his papers on engineering subjects.

Paint, Oil and Chemical Review

The old *Paint, Oil and Drug Review* was issued on July 7 in a new guise. It is now the *Paint, Oil and Chemical Review*. The use of the three words paint, oil and drug in different sequence by three leading publications must have been confusing both to the trade and the general public. Therefore, while any change is apt to be looked upon with regret by the conservative mind, it must be admitted that the change is a good one. The size of the journal, too, has been changed to a standard one of 9×12, which has many practical advantages to advertisers. The journal states that the changes are entirely external, and do not extend to personnel. The control of the paper is exactly as it was in February, 1914, when the present owners purchased the property.

Hong Kong Markets and British Dyes

An American trade weekly points out an interesting situation in the dye markets at Hong Kong. The article states that the United States had built up quite an extensive trade in Southern China in aniline dyes and synthetic indigo during the last two years. Switzerland was the chief competitor in 1919. At that time Great Britain was not exporting colours to China. Suddenly after trade with the United States was well established, the Government in London ordered that the importation of any but British manufactured dyes should be prohibited, thus shutting out their American and Swiss competitors. It now happens that the British dye-makers are not able to cope with the demand, and the result is that the entire industry has been thrown into confusion pending plans for relieving the situation.

American Dyes for Burma

The few consignments of American dyes that have arrived in Burma are repo ted satisfactory in quality. Importers have signified their desire to receive more, especially of those adapted to dyeing silks, as the supplies of the native cotton-dyeing works are obtained from India. The colours most in demand are pink (three shades), green, blue, first red, scarlet, orange, lemon, yellow, violet, black, and blue-black. Dyes for this market should be put up in 1 oz., 7 oz., and 1 lb. tins, wrapped in labels showing the colour, and packed in tin- or zinc-lined cases, as the usual paper wrappings are worthless in this climate. The smaller sized tins have the readier sale. Aniline dyes pay an import duty of 7½ per cent. ad valorem upon the fixed tariff valuation of 2 rupees per pound moist, and four rupees per pound dry.

Selenium and Tellurium

The commercial uses for these two elements are at present practically nil, yet about 300,000 lb. of the former, and 125,000 lb. of the latter are produced (more or less as by-products) from the electrolytic plants every year. Various possible uses for the metals have been suggested, but a considerable amount of research is still necessary.

To this end, several companies, including the Raritan Copper Works, Perth Amboy, N.J., the American Smelting and Refining Co., Chrome, N.J., and the Baltimore Copper Smelting and Rolling Co., Baltimore, Ltd., have agreed to furnish workable quantities of selenium and tellurium at cost price for research purpose.

E. W. Rouse of the last named firm, will ship reasonable quantities of selenium gratis at any time to investigators, while A. E. Hall of the Omaha plant of the American Smelting and Refining Co., will forward tellurium under same condition.

Dye Industry in the U.S.A.

The last five years have seen great strides made in the American dye industry. It is said that upwards of $450,000,000 (£90,000,000) has been invested in the industry, one-third having been raised since the Armistice. Imports from Germany, formerly comprising 90 per cent. of consumption in the United States, are rigorously restricted to colours not yet manufactured in America in sufficient quantity, and are limited to six months' supply. Thus encouraged the E. I. Dupont de Nemours Company have 450, the National Aniline and Chemical Company 325, and other companies also a large number of chemists engaged in supplanting German dyes, with already markedly successful results. Imports from Germany are by licence by the War Trade Bureau, but Congress is planning to put the system on a peace basis in December by means of a 10-year embargo.

All the first instalment of the reparation dyes and 60 per cent. of those under the so-called Herty option, totalling 1,000,000 lb., have arrived here. The Herty option arrangement with the German cartel covers the import of needed dyes not embraced in the reparations provisions. The Textile Alliance is handling other imports at a nominal charge through a five-year option on daily production over German needs. The promise of even greater American production of dyes is contained in current negotiations for merger, which we mention in another section.

Synthetic Ammonia for France

ACCORDING to the *Frankfurter Zeitung*, of July 25th, France at the present time, apart from her efforts in connection with the Treaty of Versailles, is desirous of obtaining the patents of the Haber process owned by the Badische Anilin und Soda Fabrik. The French Government, as agreed, has already been allowed to take over the patents registered in France, but on November 11th, 1919, it entered into private negotiations with the Badische Company in connection with the acquisition of the Haber process, and the completed agreement is now awaiting the ratification of the French Senate.

The French, who are experimenting with the Claude process, desire to add small technical details used in the Haber process, so that these may be put into use at a factory shortly to be erected. The proposal is to convert a powder factory at Toulouse, at present unused, and if no private company is prepared to develop the invention, under the supervision of the State, the State will do so on its own account. It is hoped eventually to manufacture in sufficient quantities to cover both military and agricultural requirements and so make France independent of other countries with regard to her supplies of ammonia.

References to Current Literature

British

GLASS. Reversible expansion of refractory materials. *Gas J.* July 28, pp. 184-187. H. J. Hodsman, M.Sc., and Professor J. W. Cobb. A reprint from Vol. III. of *Trans. Soc. Glass Tech.*

RUBBER. Action of certain organic accelerators in the vulcanisation of rubber. *Rubber Age*, Aug., 1920, pp. 257-260. G. D. Kratz and Others.

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GAS. *J. de Us. à Gaz.*, pp. 177-183, July. Several experiments on water-gas. A. Grehel. Manufacture and uses of water-gas.

United States

GAS. Efficiency of natural gas. Robt. F. Earhart. *Gas R.* June 23, pp. 17-20. Series of common tests show that distance between burner and vessel should be 1½ in.

HYDROCARBONS. Motor gasoline from heavier hydrocarbons. F. W. Padgett. *Chem. Age.*, July, 1920, p. 400.

IRON. The acid bessemer process. Richard S. McCaffery. *Chem. and Met. Eng.*, July 21, pp. 103-4. This paper considers certain aspects of the acid bessemer process, particularly in its relations to the duplex process.

LEAD. Anodic corrosion of lead in sodium hydroxide solutions. O. W. Brown, C. O. Henke, and L. T. Smith. *J. Phys. Chem.*, May, 367-378.

METALLURGY. The future of oxygen enrichment of air in metallurgical operations. F. G. Cottrell. *Chem. & Met. Eng.*, July 14, 53-56.

OIL. Cockle bur oil. A new seed oil. L. B. Rhodes. *J. Amer. Chem. Soc.*, July, 1,507-1,508.

POTTERY. Data on the operation of the Diessler tunnel oven in the manufacture of semi-porcelain dinner ware. J. E. Sproat and D. Allbright. *J. Amer. Ceram. Soc.*, June, 460-475.

The composition of kiln gases and their effect on terra cotta glazes and colours. F. B. Ortman. *J. Amer. Ceram. Soc.*, June, 476-488.

POWER. The problem of the world's supply of energy. S. Arrhenius. *Chem. & Met. Eng.*, July 14, 67-69. The probable results of the total consumption of the world's coal supplies are discussed.

REFRACTORIES. Design of a fire brick plant. R. H. Minton. *J. Amer. Ceram. Soc.*, June, 440-447. A layout for a plant for making fire bricks is suggested.

A possible explanation of failure under load at high temperatures as displayed by fireclay refractories. A. S. Watts. *J. Amer. Ceram. Soc.*, July, 448-459.

RUBBER. Permeability of rubber to gases, II. J. D. Edwards and S. F. Pickering. *Chem. & Met. Eng.*, July 14, 71-75. Conclusion of paper previously noted (*Chem. Age, III.*, 106).

STEEL. Some commercial heat treatments for alloy steels for structural purposes. A. H. Miller. *Chem. & Met. Eng.*, July 21, 113-116.

WASTE. Treatment of textile mill-waste waters. R. H. Eagles. *Textile Colourist.* July, p. 460.

ZINC PHOSPHATES. The system zinc oxide, phosphorus pentoxide, and water at 25° and 37°. N. E. Eberly, C. V. Gross, and W. S. Crowell. *J. Amer. Chem. Soc.*, July, 1,433-1,439.

German

ACIDS. Review of the mineral acid industry in 1919. K. Reusch. *Chem.-Zeit.*, July 22, 542-544. This instalment deals with the literature on nitric acid (*see also Chem. Age*, III., 41, 106, 134).

The syntheses of fatty acids from paraffin and other mineral oil fractions. K. Löffl. *Chem.-Zeit.*, July 29, 561-562.

ANALYSIS. Continuous electrolytic control apparatus for the estimation of carbon dioxide in flue gases, &c. K. von Haken. *Z. angew. Chem.*, July 27, 188.

The quantitative estimation of selenium. F. Wrede. *L. physiol. Chem.*, April 15, 272-275.

APPARATUS. The standardisation of chemical glassware. F. Friedricks. *Z. angew. Chem.*, July 27, 186-188. Standard designs for extraction apparatus and suction pumps are suggested.

CEMENT. Portland cement and calcium cyanamide. J. Baumann. *Chem.-Zeit.*, July 29, 562.

A process for making cement from the by-product of cyanamide manufacture is outlined.

COLLOIDS. New technical process for preparing colloidal dispersions and its possibilities for chemical industry. H. Plauson. *Chem. -Zeit.*, July 27 and 31, 553-555.565-567.

FUEL. Gaseous fuels in 1917-1919. W. Bertelsmann. *J. Gasbeleucht*, July 17, 465-468. The literature on power gas, oil gas, and gas analysis is reviewed.

GAS. Substitutes for coal in the production of illuminating gas. P. Schumann. *J. Gasbeleucht*, July 10, 447-449. The yields of gas from various raw materials and costs are compared.

GLASS. Soda compositions. L. Springer. *Sprechsaal*, July 22, 310-313. Analyses of various compositions used for making soda glass are given.

IRON. The smelting of titaniferous ironsands. R. Dürrer. *Stahl u. Eisen*, July 15, 938-941.

SHALES. The valuation of oil shales. G. Grube. *Z. Angew. Chem.*, July 20, 181-182.

STANDARDISATION. Standardisation of chemical glass ware. F. Friedrichs. *Z. Angew. Chem.*, July 20, 184. The standardisation of gas analysis apparatus is dealt with.

WATER. Estimation of objectionable carbonic acid in water. H. Noll. *Z. Angew. Chem.*, July 20, 182-184.

Chemical Matters in Parliament

Mandated Territories (Oilfields)

In reply to Lieut.-Commander Kenworthy (House of Commons, August 5), Mr. C. Harmsworth stated that friendly communications have been received from the United States with regard to equal rights for United States citizens in the development of the oilfields in mandated territories, and the matter was underconsideration, but he could not at present say whether any papers would be laid.

Oil Boring in Leicestershire

Lord H. Cavendish-Bentinck (House of Commons, August 4) asked whether permission to bore for oil on land at Weston has been refused, notwithstanding the surveyor's favourable report on the oil-bearing properties of the land; and whether in view of the importance to the community of developing every source of oil supply, he would state on what grounds permission to bore was withheld.

Mr. Kellaway replying, said the answer to the first part of the question was in the negative. The letter Lord Bentinck addressed to the President of the Board of Trade on July 23 was the first intimation received that it was desired to bore for oil on the land in question. The petroleum department is now in communication with the applicant.

Oil in Mesopotamia

Mr. Kiley (House of Commons, August 9) asked the Prime Minister whether a decision had yet been come to as to the manner in which the oil of Mesopotamia is to be exploited; and if so, what was that decision?

Mr. Bonar Law: No decision has yet been reached on this question.

Patent Literature

Abstracts of Complete Specifications

120,554. HYDROGEN SULPHIDE, METHODS OF TREATING GASES CONTAINING. W. G. Leamon, Citizens' National Bank Building, Wooster, Ohio, U.S.A. International Convention date (U.S.A.), November 8, 1917.

Gas which contains sulphuretted hydrogen, such as natural gas, coke-oven gas, producer gas, illuminating gas or the like, is preheated to 300°C. by passing it through an iron pipe coil in a furnace. A small quantity of air is then added sufficient to oxidise the hydrogen but not necessarily the sulphur, and the mixture is passed through an iron U-tube containing pumice, firebrick, broken pottery or the like, carrying a catalyst such as platinum or nickel which is heated in a furnace. The gas is then passed through a scrubber to condense the sulphur vapour.

146,546. AMMONIUM SULPHATE, PRODUCTION OF. C. W. Bailey, H. S. Denny and W. H. H. Norris, H.M. Factory, Langwith, Notts; and Sir H. E. F. Goold-Adams, Munitions Inventions Department, Princes Street, Westminster, London, S.W.1. Application date, January 5, 1918.

Ammonium sulphate is produced from gases containing ammonia by the use of nitre cake, free sulphuric acid being dispensed with. Nitre cake is mixed with water, ammonium sulphate and sodium sulphate at a temperature of 80° to 100°C., when a quantity of normal sodium sulphate in the anhydrous state is precipitated in an amount corresponding substantially with the quantity of sodium in the nitre cake. The sodium sulphate is removed, a further quantity of water is added, and the solution is used in an absorption system to extract the ammonia from Mond gas. The resulting solution consisting of ammonium sulphate, sodium sulphate and water, is treated in an evaporator to remove part of the water, when a quantity of the double salt separates out on cooling. The remaining solution is again treated in an evaporator to remove a further quantity of water and to precipitate ammonium sulphate. The residual solution is mixed with the double salt first separated, and is then suitable as regards quantity and composition for treating a similar quantity of nitre cake for another cycle of operations. In the above process, when the evaporated solution is cooled to precipitate the double salt of ammonium and sodium, the temperature should not be below 50°C., and when the filtrate is evaporated the concentration should not be sufficient to cause the ammonium sulphate crystals to be contaminated with sodium sulphate. This process is described in detail, and also a modification in which the nitre cake is treated with the lye containing sodium sulphate and ammonium sulphate. When ammonium sulphate is produced from coke-oven gases it is unnecessary to dilute the absorbent and subsequently concentrate the liquid from the saturators, and the process in this case is also described in detail. When evaporation of water is necessary, the amount evaporated is approximately the same as if sulphuric acid were employed as usual. The precipitation of the excess sodium sulphate introduced as nitre cake before the absorption of ammonia obviated the expense of evaporating in the presence of a large amount of sodium sulphate.

146,560. HYDROCARBON GAS, METHOD OF MAKING. D. Macdonald and R. F. Macdonald, 3, Queen's Road, Southport. Application date, March 8, 1919.

An electric arc is produced between carbon electrodes immersed in water, when a mixture of hydrocarbon gas and carbon dioxide is produced. The carbon dioxide is removed by treatment with alkalies or alkaline earth reagents, and the remaining gas consists substantially of acetylene.

146,583. GRINDING MILLS. E. E. Bentall and G. C. Bingham, Heybridge, Maldon, Essex. Application date, April 4, 1919.

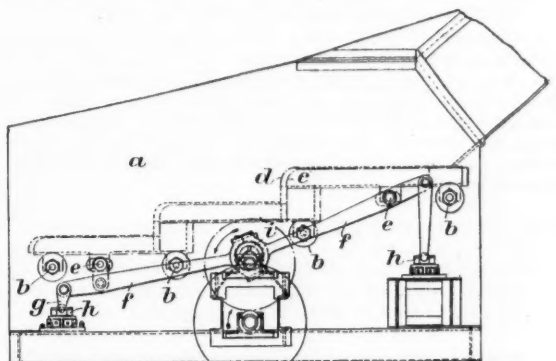
The object is to attach a rotary grading device or sifter to a grinding mill in such a way that it may be thrown out of action when desired. The mill is of ordinary construction, with a projecting delivery spout on one side. A pivot is provided projecting transversely from the frame on the same side as the delivery spout. The sifter is mounted on the pivot and may be secured with its inlet immediately below the delivery spout so that it receives the ground material. The sifter is driven by a belt from the main driving shaft; when desired it may be swung out of action about its supporting pivot, and at the same time its driving pulley is disengaged from the driving belt, which passes around a pulley on the main driving shaft.

146,598. SULPHURIC ACID, EXTRACTION OF ARSENIC AND OTHER IMPURITIES FROM. G. K. Davis, 265, Strand, London, W.C.2. Application date, April 7, 1919.

In the usual process for removing the soluble arsenious oxide from sulphuric acid by converting it into insoluble arsenious sulphide by the action of sulphuretted hydrogen, it is not usually possible to deal with acid having a strength above 110°Tw. owing to the formation of free sulphurous acid which re-dissolves the arsenious sulphide. The object is to remove arsenic and other impurities from acid of strengths up to 150°Tw. The acid from the denitration apparatus is cooled and then rapidly and completely impregnated with sulphuretted hydrogen. The acid containing arsenious sulphide in suspension is immediately filtered without any preliminary settling in a vacuum or pressure filter, so that the arsenic is removed before any redissolving takes place. The temperature during the whole process should not exceed 18°C.

146,600. CONVEYING AND SCREENING OF MATERIALS, APPARATUS FOR. Sir R. A. Hadfield, 22, Carlton House Terrace, Westminster; and W. T. W. Miller, 6, Oakdale Road, Sheffield. Application date, April 7, 1919.

The apparatus is of the type in which the material is subjected to agitation by a system of longitudinal members for conveyance, grading, separating or screening. Two side



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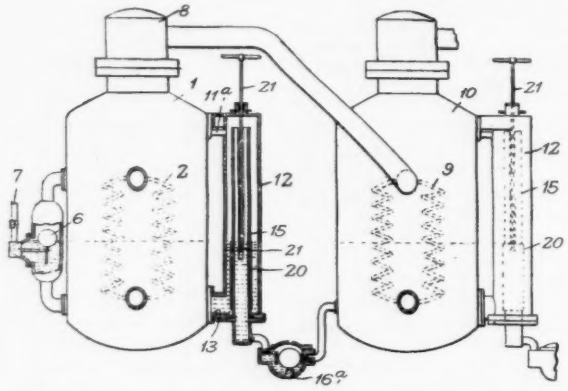
plates *a* are connected by tie rods *b* which support stepped longitudinal members *c* in the form of rectangular bars forming a grating. A similar grating is built up of bars *d* supported by bolts *e* from four oscillating rods *f* which are connected at one end to toggle links *g* supported in bearings *h*, which are adjustable horizontally or vertically. The rods *f* are oscillated by eccentrics *i*, so that the grating attached to them is given an elliptical movement relatively to the fixed grating which intersects it. The nature of the oscillation is varied by adjustment of the toggles.

146,730. EVAPORATORS. W. J. Mellersh-Jackson, London. (From The Griscom-Russell Co., 90, West Street, New York). Application date, July 28, 1919.

The object is to maintain the liquid levels in evaporators of the multiple effect type, in which liquids which are liable to deposit scale are being treated. If the usual float feed controls are used the valves are liable to become inoperative through accumulation of scale. Liquid is supplied through the pipe 7 controlled by a float valve 6 to the first evaporator 1, where it is evaporated by steam passed through the coils 2.

The vapour passes through a separator 8 and thence to the coils 9 of the second evaporator 10. The vapour and liquid spaces of the evaporator 1 are connected by passages 11A, 13, to a drum 12, so that the liquid stands at the same level in the drum. A stand pipe 15 extending upwards into the drum is open at the top and provided with two longitudinal slots extending downwards from the top as shown. The liquid



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passes through these slots into the pipe 15 at a rate which is determined only by the dimensions of the slot and the head of liquid over the bottom of the slot. The level of the bottom of the slot may be varied by moving the sleeve 20 by means of the rod 21 and handle 22. The liquid passes through a steam trap 16A to the second evaporator. The controlling device within the drum 12 is not rendered inoperative by a deposit of scale from the hot liquid.

146,734. VULCANISING DISSOLVED CAOUTCHOUC, PROCESS FOR. S. J. Peachey, 5, Yew Tree Road, Davenport, Cheshire. Application date, August 2, 1919.

A solution of indiarubber in benzene, naphtha, carbon bisulphide, or other solvent is mixed with sulphur and with a small quantity of nitrosobenzene (C_6H_5NO), and left to stand for about 30 minutes at atmospheric temperature. The solution sets to a jelly, and when the solvent is evaporated a mass of vulcanised indiarubber is obtained. The nitrosobenzene may be replaced by any similarly constituted nitrosohydrocarbon of the cyclic series.

NOTE.—Specification 126,279 (Soc. Chimique des Usines du Rhone), which is now accepted, was abstracted when it became open to inspection under the International Convention; it relates to apparatus for catalytic reactions. *See* THE CHEMICAL AGE, Vol. I., page 144.

International Specifications Not yet Accepted

143,920. CONCENTRATING ORES. Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.), 35, Lindenstrasse, Berlin. International Convention date, July 29, 1918.

The ground ore is treated by a flotation process, and during or previous to this operation water-glass or other sol-forming electrolyte is added. Material such as clay passes into suspension in the sol condition and may be separated from the residue, which is then subjected to flotation to extract the mineral matter. Aniline and pyridine are examples of froth-forming agents which do not destroy the sol condition.

143,921. ELECTRIC ENDOSMOSE. Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.). 35, Lindenstrasse, Berlin. International Convention date, November 30, 1918.

Hides, skins, &c., are impreganted with tanning material, such as extract of pine bark, oak or chestnut, by electric endosmose. The liquor may be of density 2-3°Bé., and the treatment may last two to three hours. This is followed by stronger liquor of 10°Bé. for two days without electric current to complete the tanning. The process is applicable for impregnating fabrics which have been treated with glue or gelatine, with chromium or other metal salts.

144,240. TREATING SOLIDS WITH LIQUIDS. B. Junquera, Calle G. Besada, Oviedo, Spain. International Convention date, May 30, 1919.

The solid material is maintained on the inner surface of a rotating drum by centrifugal force, and the liquid with which it is to be treated is forced through it in a direction radially inwards. This is effected by providing a closed annular jacket surrounding the drum, to which the liquid is supplied through a radial conduit from the axis of the drum. The radial "head" of liquid in the radial conduit forces the liquid through the porous periphery of the drum. The liquid layer which collects on the inner surface of the solid layer is removed by a skimming pipe. The apparatus is applicable for the treatment of minerals containing sodium or potassium chloride or nitrate, or for extracting metals, such as gold, silver, or copper from ores.

144,244. ALCOHOL, PRODUCTION OF. A. Meyer, 52, Albregt Engelmanstraat, Rotterdam. International Convention date, May 31, 1919.

Yeast and alcohol are produced by fermentation at reduced pressure in closed vessels provided with stirrers and cooling coils. The alcohol is recovered from the carbon dioxide in a column apparatus containing water.

144,260. LEAD AND SILVER CHLORIDES. Amalgamated Zinc (De Bavay's), Ltd., 360, Collins Street, Melbourne. International Convention date, May 17, 1919.

The process is for extracting silver and lead separately from sulphide ores. The ore is heated with zinc chloride to chlordise the silver and lead, the excess of zinc chloride is removed by leaching with dilute hydrochloric acid, and the residue is then leached with cold brine containing ferric chloride, which may be saturated with lead chloride so as to extract the silver only. The lead chloride is then dissolved out with hot brine.

144,266. CAUSTIC SODA. Scheweizerische Sodafabrik, Zurzach, Argovie, Switzerland. International Convention date, June 4, 1919.

Soda solution is emulsified with lime in a turbo-mixer containing at least one centrifugal blade wheel, to produce caustic soda.

144,276. TREATING ORES. W. Tyrrell, 729, New York Block, Seattle, Wash., U.S.A. International Convention date, May 29, 1919.

A binder to be used in the proportion of 4 per cent. for briquetting ores concentrates, &c., consists of sodium sulphate 2 parts, diatomaceous earth 2 parts, concentrated lye 2 parts, magnesium carbonate 1 part, with or without salt, 1 part.

144,278. FILTERS. United Filters Corporation, New York. (Assignees of E. J. Sweetland, Montclair, N.J., U.S.A.). International Convention date, May 18, 1916.

The casing of a leaf filter is formed of two semi-cylindrical parts which are connected together by swing bolts suspended from cans mounted on two longitudinal shafts carried by the upper part. The lower part is mounted on trunnions, so that when separated solid matter is to be discharged, the upper part may be lifted by steam or hydraulic cylinders, and the lower part may then be turned over on the trunnions. The liquid is supplied and discharged through the trunnions.

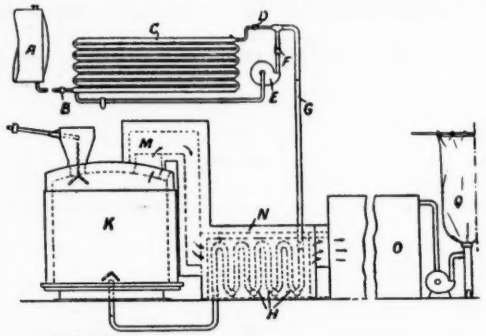
144,310. AZO DYES. Farbenfabriken vorm F. Bayer & Co. Leverkusen, near Cologne. International Convention date, July 16, 1918.

Azo dyes which produce red to blue fast shades on cotton are produced by coupling 5:5'-dioxy-2:2'-dinaphthylamine-7:7'-disulphonic acid with diazo compounds containing a sulphonic or carboxylic acid group in *o*-position. Examples are given in which 4-chlor-2-aminobenzoic acid is used to produce a monoazo dye and in which primary disazo dyes are produced by using (1) two molecules of anthranilic acid, (2) 4:5-dichloraniline-2-sulphonic acid and 4-chlor-2-aminobenzoic acid, (3) anthranilic acid and 4-chlor-2-aminophenol, (4) 1-naphthylamine-2-sulphonic acid and 4-chlor-2-amino-benzoic acid, (5) two molecules of 4-dimethylamino-1-aminobenzene-2-sulphonic acid; and also in which a trisazo dye is produced by diazotising the monoazo dye from anthranilic acid and

3-amino-4-cresol methyl ether and coupling with the monoazo dye from anthranilic acid and the disulphonic acid compound first mentioned above.

144,306. SULPHUR, RECOVERING FROM SULPHUR DIOXIDE. American Smelting and Refining Co., 120, Broadway, New York. (Assignees of G. C. Howard, Tacoma, Wash., U.S.A.). International Convention date, September 9, 1918.

Liquid sulphur dioxide obtained from metallurgical gases passes from the tank A through expansion coils C, and on



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reaching the pipe G is mixed with a regulated amount of air supplied by the pump E, the mixture being then preheated in the coils H by means of the hot gases from the furnace K. The hot gas passes through the furnace K in contact with incandescent coke and sulphur is liberated. The gases are passed through the preheater to the settling chamber O where the sulphur condenses.

LATEST NOTIFICATIONS.

148,291. Process for the Oxidisation of oils. Schicht Akt.-Ges., G. April 16, 1919.

148,339. Manufacture of a new colour of the anthraquinone series. L. Cassella & Co. March 15, 1915.

148,351. Process for the manufacture of sulphide of zinc, applicable for the preparation of zinc-oxide. Helbronner. A. October 16, 1916.

148,358. Oxidising hydrocarbons and their oxidation products. Teichner, G. May 15, 1919.

148,366. Process for the production of new derivatives of the condensation products of aldehydes and phenol. Bucherer, H. March 22, 1919.

148,408. Process for the production of tetrahydro-β-napthol- and tetradydro-β-thionapthol. Tetralin, Ges. May 18, 1916.

148,419. Process for the production of ar-1-tetrahydro napthalene-sulphonic acid and of the conversion products of their chlorides. Tetralin, Ges. February 25, 1919.

148,456. Process for the producing low-carbon ferro-chromium. Krupp Akt.-Ges., F. July 27, 1916.

148,564. Purification of hydrogen or oxygen. Jaubert, G. F. October 12, 1918.

148,579. Process for obtaining the salts of sulpho acids and alkyl-sulphuric acids from acid resins. Seidfeldt & Co. March 14, 1919.

148,738. Process for the manufacture of artificial tanning substances. Melamid, M. July 21, 1919.

148,743. Manufacture of normal butyl paramino benzoate. Soc. Chimique Des Usines Du Rhone. July 30, 1919.

Specifications Accepted, with Date of Application

124,761. Absorbing gases from a gaseous mixture, Apparatus for. General Chemical Co. November 3, 1917.

125,986. Detergent compound. A. W. Foree. April 19, 1918.

138,331. Glycerol from sugar. Vereinigte Chemische Werke Akt.-Ges. June 18, 1917.

147,956. Separating the constituents of air or other gaseous mixtures, Process for. Ges. fur Linde's Eismaschinen. July 11, 1917.

147,958. Cuprous oxide, Process for the manufacture and use of. E. C. R. Marks. (*Huttenwerk Neiderschoneweide Akt.-Ges. vorm J. F. Ginsberg.*) February 1, 1918.

147,964. Aromatic alkyl-amino compounds. F. W. Attack and W. N. Haworth. January 22, 1919.

147,967. Sulphonating processes, and apparatus for carrying out the same. F. C. Sutton. February 20, 1919.

147,988. Electric furnaces. A. M. Teixeira. April 23, 1919.

147,999. Iron, Production of. A. Jackson. April 25, 1919.

148,027. Gas, apparatus for making. D. E. Campbell. May 9, 1919.

148,057. Gas producers. J. F. Wells. August 22, 1919.

148,074. Complex silver salts of aliphatic amino acids, Process for the manufacture of. H. R. Napp. (*F. Hoffmann La Roche & Co.*) September 23, 1919.

148,095. Hypochlorites, Electrolytic apparatus for the direct production of. P. Pestalozza. December 19, 1919.

Applications for Patents

Atack, F. W. Halogenation of anthraquinone derivatives. 23,113. August 5.

" Intermediates and dye-stuffs of anthraquinone series. 23,114. August 5.

Badische Anilin & Soda-Fabrik. Process for de-sulphurising gases. 23,031. August 4.

Barbet et Fils et Cie, E. Recovery of volatile liquids from mixtures with air. 22,888. August 3. (France, August 1, 1919.)

Bronnert, E. Manufacture of artificial silk. 22,898. August 3.

" Process for production of high-percentage sulphite cellulose. 23,036. August 4.

" Manufacture of artificial silk. 23,165. August 6.

Dreyfus, H. Manufacture of films, celluloid-like masses, blocks, &c. 22,974. August 4.

Evans, E. C. Destructive distillation of carbonaceous substances. 23,110. August 5.

Hewitt, J. T. Production of tasteless derivative of quinidine. 23,046. August 5.

Hinchley, J. W. Expressing liquids from materials. 22,880. August 3.

Johnson, J. Y. (Badische Anilin & Soda-Fabrik.) Process for desulphurising gases.) 23,031. August 4.

Kuh, E. Process for production of neutral alkyl esters of sulphuric acid. 22,873. August 3. (Austria, August 8, 1919.)

Mooney, F. M. Manufacture of a solution of chromic sulphate. 23,020. August 4.

Soutar, C. W. Intermediates and dye-stuffs of anthraquinone series. 23,114. August 5.

Redmanol Chemical Products Co. (Wade, H.) Production of phenolic condensation products. 22,612. 22,613. July 29.

South Metropolitan Gas Co. and Stanier, H. Process for removing hydrogen sulphide from gases. 22,585. July 29.

Tozer, C. W. Low-temperature carbonisation and gasification of coal, &c. 22,637. July 30.

Wilton, N. and T. O. Manufacture of sulphate of ammonia. 23,247. August 10.

Patents Court Cases

Notice has been given of an application by British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, for a compulsory licence in respect of Patent 3,373, dated February 14, 1908, in the name of G. B. Ellis (Chemische Fabrik vormals Sandoz, Basle, Switzerland). The patent relates to the manufacture of yellow dyes suitable for wool. Any notice of opposition must be given by August 25, 1920.

Notice has also been given of an application for the following patents to be indorsed Licences of Right under Sect. 24 of the new Patents Act: 19,604-5 of 1912 relating to the manufacture of hydrochloric acid and alkali-silico-aluminate, and 107,640 relating to the treatment of silicates. The above are in the name of A. H. Cowles. Any notice of opposition must be given by September 13, 1920.

Patents in Sweden

THE Board of Trade have received copy of a new Swedish Law (No. 294) dated June 18, 1920, relating to the restoration in certain cases of patent applications and patent rights which have lapsed during the period August 1, 1914, to June 30, 1920. This Law, which came into force on July 1, 1920, provides that requests for the reconsideration of a patent application which has been refused or rejected during the above mentioned period by reason of the failure of the applicant to answer objections by the patent authorities or writs of opposition, or requests for the restoration of a patent which has expired during the same period by reason of non-payment of renewal fees, may be made in writing to the patent authorities before July 1, 1921. It is also provided that the period from August 1, 1914, to June 30, 1920, shall not as to any part thereof be reckoned in the period of three years within which a patent must be worked in Sweden. Nominally the Law applies only to patent applications filed, and patents held, by Swedish subjects, but the Crown is empowered, subject to reciprocity, to decree that the provisions of the Law shall apply, wholly or partly, in favour of nationals of a foreign State. The Swedish text of the Law, and an English translation, may be consulted in the Public Library of the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C.

Monthly Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

WEDNESDAY, August 11.

Trade this week is still only on the quiet side, although there has been a more satisfactory inquiry. A number of buyers are still away and with the prevailing holiday season the demand cannot be expected to revive to any great extent for a week or two.

As regards export trade, this has been good in places, but widely fluctuating exchanges have retarded business very considerably on the Continent. Stocks, however, are becoming lighter in second hands, and manufacturing costs do not come down, so that on the whole the position can be viewed with equanimity, and it is to be hoped that the present lull in business is the fore-runner of a speedy return to more stable conditions.

General Chemicals

ACETONE is without feature and only in quiet demand.

ACID ACETIC is well maintained as regards value, but the demand is only light. Arrivals, however, are not so plentiful, and with the decline in the exchange the price has a tendency to become firmer.

ACID CARBOLIC is weak and export licences difficult to obtain.

ACID CITRIC continues on its downward way, with plentiful supplies and little business.

ACID FORMIC is quiet, without change in price.

ACID LACTIC is without feature.

ACID OXALIC has been in slightly better demand, without appreciable change in price.

ARSENIC still continues scarce and price very firm.

BARIUM SALTS are quiet, and offers are being received from Germany for Chloride. There has been an increase in the demand for Nitrate.

COPPER SULPHATE is without feature and practically no business to speak of being transacted.

FORMALDEHYDE is in fair request, and price is without change.

LEAD SALTS are only in small request, but without change in price.

POTASSIUM BICHROMATE is lower in value and larger supplies are available.

POTASSIUM CHLORIDE is dull and without feature.

POTASSIUM CARBONATE is in better request with fair supplies available.

POTASSIUM NITRATE is asked for on export account.

POTASSIUM PERMANGANATE is quiet without nominal change in value.

POTASSIUM PRUSSIATE.—A better business has been passing, and there is practically no change in value.

SODIUM ACETATE is inclined to be weak with very little business moving.

SODIUM BICARBONATE is in request on export account.

SODIUM BICHROMATE is lower in price.

SODIUM BISULPHITE is scarce and firm and early delivery cannot be given by English makers.

SODIUM CAUSTIC is a shade firmer on the week, some of the weak resale parcels having been absorbed.

SODIUM HYPOSULPHITE is still almost nominal, with the demand exceeding the supply.

SODIUM NITRITE is scarce and firm.

SODIUM PRUSSIATE has again appreciably declined on the week, and there is practically no demand.

SODIUM SULPHIDE, although still in request is not perhaps quite so difficult to obtain, and small concessions may be obtained here and there.

STRONTIUM NITRATE has been in request on export account, but supplies are not easy to obtain.

SULPHUR CHLORIDE has been fairly active at last quoted figures.

ZINC SALTS are inclined to be slow, but without appreciable change in value.

Coal Tar Intermediates

Only a small business has been transacted this week, but with works fully occupied and well booked ahead with orders, the position is not likely to materially change for some time ahead.

ALPHA NAPHTHOL.—Early delivery cannot be given by English makers.

ALPHA NAPHTHYLAMINE has been in better request without change in price.

BENZALDEHYDE is firmer with some good inquiries passing on export account.

BENZIDINE BASE is wanted, but only small supplies are obtainable.

DINITROPHENOL.—Only small supplies are available, and the price is very firm.

DIPHENYLAMINE is quiet without change in value.

NITRO NAPHTHALINE has been in demand, and price is inclined to be higher.

Coal Tar Products

There is little change to report in most Coal Tar Products.

90's BENZOL is quoted at 3s. 2d. on rails in the North and 3s. 4d. in London. Supplies are scarce.

PURE BENZOL is worth 3s. 6d. to 3s. 9d. per gallon on rails.

CREOSOTE OIL remains firm at 1s. to 1s. 1d. in the North and 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID is still somewhat slow and is quoted at 4s. to 4s. 2d. per gallon for the Dark 95-97 per cent. quality and 4s. 6d. to 4s. 9d. per gallon for the Pale 97-99 per cent. quality.

SOLVENT NAPHTHA, 90/160, is worth about 3s. 3d. per gallon on rails.

HEAVY NAPHTHA, 90/190, is still worth 3s. 6d. per gallon.

NAPHTHALENE.—The demand for this article in both Crude and Refined forms is increasing and the price is still £16 to £20 for the Crude and £50 to £52 a ton for the Refined.

PITCH.—The market is firm but only a moderate amount of business is passing largely owing to the absence of sellers. To-day's prices are 200s. to 210s. f.o.b. London, 195s. to 200s. f.o.b. East Coast, 185s. to 195s. f.o.b. West Coast.

Sulphate of Ammonia

There is no change in the position.

German Market Report

Buyers are showing extreme caution in this market at the present time. Generally, manufacturers' inland prices are on a parity with foreign quotations.

The efforts recently made by some of the German chemical producers to re-establish themselves in foreign markets has so far not been very productive, but this can be explained to a certain extent by the general slackness which has been experienced in the industry during the last month or two.

ARSENIC has been in steady request at from 9/10 marks per kilo.

ALUM CHROME has been available at 7 marks per kilo.

ACID OXALIC has been very active and a good business has been transacted at from 20/21 marks per kilo.

ACID ACETIC has been wanted, and the price is 10 marks per kilo.

ACID FORMIC is only in quiet demand at 11 marks per kilo.

SODIUM HYPOSULPHITE has been asked for, and the price is 5 marks per kilo.

POTASSIUM PRUSSIATE has been well supported, and is standing at about 30 marks per kilo.

French Market Report

Trade is still very depressed, but manufacturers are firm in their ideas of price, and not inclined to make concessions. Stocks in second hands are becoming lighter as fresh supplies are placed on the market.

ACID BORIC is 430 frs. per 100 kilos.

ACID CITRIC is quiet at 25 frs. per kilo.

ACID OXALIC is in request at about 1450 frs. per 100 kilos.

ALUM CHROME is quiet at 600 frs. per 100 kilos.

ALUMINA SULPHATE is in better request at 90 frs. for 14/15 per cent. material.

LEAD NITRATE has been more active at 275 frs.

POTASSIUM PRUSSIATE is in better demand at 1250 frs.

POTASSIUM CHLORATE is slow of sale at 275 frs.

SODIUM BICARBONATE has been quiet at 100 frs.

SODIUM PRUSSIATE has been easy at about 900 frs. per 100 kilos.

SODIUM ARSENIATE is in better demand at 350 frs. per 100 kilos.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	3	9	to	0	4	0
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	125	0	0
Acid, Acetic, glacial, 99-100%	ton	110	0	0	to	115	0	0
Acetic, 80% pure	ton	87	10	0	to	90	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	1½	to	0	1	2
Citric	lb.	0	4	9	to	0	5	0
Fluoric	lb.	0	0	7½	to	0	0	8
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.		8	3	to	0	8	6
Hydrofluoric	lb.	0	0	7½	to	0	0	8
Lactic, 50 vol.	ton	58	0	0	to	60	0	0
Lactic, 60 vol.	ton	72	10	0	to	75	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	6	to	0	2	7
Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	6	to	0	2	8
Salicylic, B.P.	lb.	0	3	3	to	0	3	6
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	0	to	0	3	3
Tartaric	lb.	0	3	3	to	0	3	4
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	45	0	0	to	50	0	0
Ammonia, .920	ton	32	10	0	to	37	10	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	100	0	0	to	105	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	65	0	0	to	70	0	0
Ammonia, phosphate	ton	125	0	0	to	130	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	3
Amyl acetate	ton	410	0	0	to	420	0	0
Arsenic, white, powdered	ton	74	0	0	to	76	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	31	0	0	to	33	0	0
Nitrate	ton	55	0	0	to	56	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	8
Bleaching powder, 35-37%	ton	26	0	0	to	28	0	0
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
,, Grey	ton	35	0	0	to	37	10	0
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	9	10	0	to	10	10	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	75	0	0	to	80	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	8	6	to	0	9	0
Oxide, black	lb.	0	10	0	to	0	10	3
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	41	0	0	to	42	0	0
Cream Tartar, 98-100%	ton	225	0	0	to	235	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	340	0	0	to	345	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	87	10	0	to	90	0	0
Carbonate (White Lead)	ton	70	0	0	to	72	10	0
Nitrate	ton	72	0	0	to	75	0	0
Litharge	ton	59	0	0	to	61	0	0
Lithopone, 30%	ton	51	0	0	to	53	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	13	10	0	to	14	0	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	19	0	0	to		—	
Sulphate	ton	100	0	0	to	105	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.		Nominal.					
Nickel ammonium sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	2	1	to	0	2	2
Potassium Carbonate, 90%	ton	115	0	0	to	120	0	0
Chloride	ton	Nominal.						
Chlorate	lb.	0	0	9½	to	0	0	10½
Meta-bisulphite, 50-52%	ton	260	0	0	to	270	0	0
Nitrate, refined	ton	65	0	0	to	67	0	0
Permanganate	lb.	0	4	6	to	0	4	9
Prussiate, red	lb.	0	5	3	to	0	5	6
Prussiate, yellow	lb.	0	2	1	to	0	2	2
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	10	0	to		—	
Seconds	cwt.	5	5	0	to		—	
Sodium acetate	ton	59	0	0	to	61	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	9	to	11	0	0
Bichromate	lb.	0	1	7	to	0	1	8
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0
Chlorate	lb.	0	0	5½	to	0	0	6
Caustic, 70%	ton	38	0	0	to	40	0	0
Caustic, 76%	ton	41	0	0	to	43	0	0
Hydrosulphite, powder, 85%	lb.	0	4	0	to	0	4	6
Hyposulphite, commercial	ton	35	10	0	to	37	10	0
Nitrite, 96-98%	ton	100	0	0	to	105	0	0
Phosphate, crystal	ton	43	0	0	to	45	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	2	to	0	1	3
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	62	10	0	to	64	0	0
Sulphite, cryst.	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	3	4	to	0	3	5
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	72	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	6	to	0	5	9
Alphanaphthylamine	lb.	0	4	0	to	0	4	3
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	9	to	0	6	0
Benzidine, base	lb.	0	13	6	to	0	14	0
Benzidine, sulphate	lb.	0	10	6	to	0	11	0
Benzoic acid	lb.	0	5	3	to	0	5	6
Benzoate of soda	lb.	0	5	3	to	0	5	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	5	6	to	0	5	9
Betanaphthylamine, technical	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3

	per	£	s.	d.		£	s.	d.
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	4	to	0	1	5
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	5	3	to	0	5	9
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	6	to	0	15	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	3
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	4	to	0	1	6
Nitrotoluol	lb.	0	1	3	to	0	1	4
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	3	to	0	1	4
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	6
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	6	to	0	9	0
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	6	to	0	9	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	1	2	6	to	1	5	0
Salol	lb.	0	6	9	to	0	7	6
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	6	to	0	1	7
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

The following prices are furnished by Messrs. Miles, Mole & Co., Ltd., 101, Leadenhall Street, London, E.C.

Metals and Ferro-Alloys

Aluminium, 98-99%	ton	165	0	0	to	163	0	0
Antimony, English	ton	60	0	0	to	62	0	0
Copper, best selected	ton	107	0	0	to	109	0	0
Ferro Chrome, 60%	ton	44	0	0	to	45	0	0
Manganese, loose	ton	38	0	0	to	39	0	0
Silicon, 45-50%	ton	24	0	0	to	25	0	0
Tungsten, 75-80%	lb.	0	3	3	to	0	3	6
Lead Ingot	ton	37	0	0	to	38	0	0
Lead Sheets	ton	52	0	0	to	53	0	0
Nickel, 98-99%	ton	230	0	0	to	231	0	0
Tin	ton			279	0	0		
Zinc Sheet	ton	74	0	0	to	75	0	0
Spelter	ton	45	0	0	to	46	0	0

Structural Steel

Angles and Tees	ton	26	0	0	to	33	0	0
Flats and rounds	ton	28	0	0	to	33	0	0
Joists	ton	25	0	0	to	26	0	0
Plates	ton	26	0	0	to	34	0	0
Rails, heavy	ton	25	0	0	to	27	0	0
Sheets, 24 Gauge	ton	47	0	0	to	48	0	0
Galvd. Corrd. Sheets	ton	50	0	0	to	51	0	0

Alsatian Potash

THE shipment of potash from the Alsatian mines to the United Kingdom during the week was well up to the average for the past three months. The following quantities were forwarded: sylvinite (French kainit), 14-16 per cent., 7,007½ tons; sylvinite (French manure salts), 20 per cent., 1,505 tons; muriate of potash, 50 per cent., 400 tons. Prices per ton f.o.r. in bags: sylvinite (French kainit), 14-16 per cent., £7 15s.; sylvinite (French potash manure salts), 20 per cent., £9 15s.; muriate of potash, 50 per cent., £28 5s.

On Wednesday a valuable consignment of chemicals caught fire on the Hertford Bridge Flats, on the main London to Southampton road, and in a few minutes all that remained of a three-ton motor-lorry and its contents, valued at £2,000, was a heap of twisted iron and ashes. The lorry and chemicals were the property of Messrs. Evans, of Bartholomew Close, London.

Catalogues Received

T. Broadbent & Sons, Ltd.

A booklet on the automatic centrifugal clutches manufactured by this company. The clutch has evidently been evolved to overcome the difficulty experienced in starting and accelerating a motor driving a load requiring a large starting torque, without the use of special switchgear and with a minimum starting current. The clutch is entirely automatic, the load being taken up gradually as the motor accelerates, and can be designed to allow the motor to run up to 75 per cent. of full speed before taking up the load. The company claim that the clutch is particularly suitable for use with alternating-current motors of the squirrel-cage type. The clutch may take the form of either a coupling or a pulley to suit the working conditions. The booklet also contains information of interest to engineers and others.—Central Ironworks, Huddersfield.

The Steel Barrel Company

We believe that systems for the storage and measurement of motor spirit have long been in vogue in the States. From the catalogue received from the Steel Barrel Co., it appears that they have already installed some hundreds of these plants in the United Kingdom. The booklet should be of special interest to garage proprietors and to works and private owners of motor vehicles that are in constant use. The aim of the plants is to allow of the spirit being handled cleanly and rapidly, and since spirit is bought more cheaply in bulk than in tins, there is evidently a two-fold saving to be effected by the installation of one. There is also, it is claimed, an increased immunity from fire. The catalogue, which is illustrated with both photographs and diagrams, can be obtained on application to the company at Phœnix Wharf, Uxbridge, Middlesex.

Brotherton & Co., Ltd.

WE have received from the above firm a series of three more booklets on "Straw Bleaching," "Oil Bleaching" and "Glue Bleaching." They are additional numbers of the series of "Hydrosulphite" booklets, which are being published by the same manufacturers. All contain simple directions for the use of sodium hydrosulphite as a bleaching agent. Copies of these attractively produced booklets may be obtained by responsible persons on application to Brotherton & Co., Ltd., ammonia and tar distillers, City Chambers, Leeds.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

Locality of Firm or Agent.	Materials.	Ref. No.
Montreal	Soap	154
Montreal	Tartaric and citric acids. Replies to the Canadian Government Trade Commissioners' Office, Portland House, 73, Basinghall Street, London, E.C. 2.	—
New Zealand	Sheet and plate glass	157
Cape Town	Phosphor bronze; white metal	158
Bulgaria	Paint. Replies to the Commercial Commissioner at the British Legation, Sofia.	—
Rio de Janeiro	Chemicals	205

Recent Wills

Mr. E. Guy, of Hereford, chemist £3,350

Mr. William Wilton Parkin, of Skerne Mills, Darlington, manufacturing chemists £3,672

Mr. William James Cowan, of Crutched Friars, London, E.C., Chemical and Colour Trader £6,222

Mr. Thomas Henry Sutton, of Marston Lodge, Croydon Road, Anerley, formerly in business as a Chemist in Bermondsey £11,899

Company News

MAYPOLE DAIRY.—A dividend of 4½d. per share was declared on the deferred shares, payable on August 31.

UNITED ALKALI.—An interim dividend has been declared of 1s. 3d. per share, less tax, on the ordinary shares.

BRITISH OIL & CAKE MILLS.—An interim dividend has been declared on the ordinary shares of 10 per cent., less tax, for the current year.

INTERNATIONAL PAINT & COMPOSITIONS.—An interim dividend has been declared of 3 per cent. on the ordinary shares, less income tax.

LINOLEUM MANUFACTURING.—Interim dividend has been declared on account of the year 1920 of 5s. per share, free of tax, payable August 13.

INTERNATIONAL NICKEL.—A quarterly dividend has been declared of 1¾ per cent. on the preferred stock, payable on August 8, to holders of record on July 22.

MIAMI COPPER.—A dividend has been declared of 50 cents per share, less tax, on the capital stock for the quarter, payable on August 16. The dividend last year was the same.

TEAM BY-PRODUCTS.—An interim dividend has been declared of 3s. per share on fully-paid shares and other shares in proportion, payable August 6. Last year, no interim dividend was paid.

INTERNATIONAL NICKEL CO.—The net profits for the past year amounted to $2,745,734 after providing for depreciation and all charges. After payment of preferred dividends there remains $2,210,978.

MOLASSINE CO., LTD.—At the annual general meeting on Tuesday, Mr. John Prosser (the chairman) presiding, it was decided, in addition to the current year's dividend on the preference shares, to pay a dividend of 10 per cent. on the ordinary shares. The balance-sheet shows a profit for the year of £23,423, which, with £5,968 brought forward, makes a total of £29,391. The chairman stated that the greatest difficulty during the year had been that of transport, which had been common to all manufacturing concerns. The profits would have been very considerably larger if the company had only been able to convey the raw materials to their factory. A very large number of orders had to be cancelled at the end of the season in consequence. So far as he could see into the future he thought the transport position would be much improved.

Coal and Benzol Plant for Italy

THE Department of Overseas Trade announce that a despatch has been received from the Commercial Counsellor to H.M. Embassy at Rome (Sir E. Capel Cure) to the effect that a well-known Italian firm of explosive manufacturers are engaged in replacing much of their war and pre-war equipment by extensive coal and benzol sub-product plant and are already turning out several lines not previously manufactured in Italy, such as phenol, saccharine, black dye, aniline, chemical manure, cinematograph films, and pure crystallised synthetic carbolic acid. The company, it is stated, would prefer to obtain a part of the necessary machinery in Great Britain, if prices are satisfactory, and the manager would welcome catalogues and price lists of the above-mentioned plant as well as of machine tools.

United Kingdom manufacturers who are interested in the foregoing and are desirous of bringing details of their manufactures to the notice of the company will be furnished with full particulars on application to the department at 35, Old Queen Street, S.W.1.

Books Received

PRELIMINARY STUDIES FOR H.M. FACTORY, GRETNA, AND STUDY FOR AN INSTALLATION OF PHOSGENE MANUFACTURE. Ministry of Munitions, Department of Explosives Supply. London: His Majesty's Stationery Office. Pp. 145. 15s. net.

AN INTRODUCTION TO CHEMICAL ENGINEERING. By A. F. Allen. London: Sir Isaac Pitman & Sons, Ltd. Pp. 272. 10s. 6d. net.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnerships Dissolved

ROTH, VICTOR ANYON, TAYLOR, HAROLD CHADWICK, and ATKINSON, JOHN ABBOTT, chemical manufacturers and merchants, 38, Corn Exchange, Fennel Street, Manchester, under the style or firm of Taylor, Roth & Atkinson, by mutual consent as and from June 30, 1920. All debts received and paid by H. C. Taylor and J. A. Atkinson, who will continue the business under the style of Taylor & Atkinson.

WALPOLE, GEORGE STANLEY, and BRUMWELL, WALTER, consulting chemists, &c., 121, Victoria Street, Westminster, S.W., under the style of G. Stanley Walpole, by mutual consent as and from June 30, 1920. All debts received and paid by G. S. Walpole.

Bankruptcy Information

FISHWICK, WILLIAM, 227, Moor Road, Chorley, Lancs., printworks' chemist. First meeting, Aug. 8, 10.30 a.m., Official Receiver's Offices, 13, Winckley Street, Preston. Public examination September 3, 11 a.m., Sessions Hall, Lancaster Road, Preston.

Notice of Intended Dividend

HUTCHISON, JOSEPH ANDERSON, 44, Dean Avenue, Bolton, lately carrying on business at Hulton, near Bolton, tar distiller. August 14. Trustee, J. G. Gibson, official receiver, Byron Street, Manchester.

Companies Winding Up Voluntarily

BASIC PHOSPHATE CO., LTD. (in voluntary liquidation).—A meeting of creditors will be held at the Carlton Iron Works, Stillington Station, via Ferryhill, on Monday, August 9, at 3 p.m. W. Thomlinson, Liquidator.

DORSET GLASS CO., LTD. (in voluntary liquidation).—A meeting of creditors will be held at 6, South Street, Dorchester, on August 18, at 5 p.m. E. J. Stevens, Liquidator.

ODAMS NITROPHOSPHATE & CHEMICAL CO., LTD. (in liquidation).—A meeting of creditors will be held at 99, Cheapside, London, E.C., on Tuesday, August 10, at 2.30 p.m. F. B. Lacy, H. E. Sier, Joint Liquidators.

NEW CHESHIRE SALT CO., LTD.—A general meeting of members will be held at 13, Eastgate Row North, Chester, on Tuesday, September 7, at 3 p.m. E. Andrews, Liquidator.

PERIVALE EXPLOSIVES, LTD. (in voluntary liquidation).—A general meeting of members will be held at the offices of Johnson, Weatherall, Sturt & Hardy, 7, King's Bench Walk, Temple, London, E.C. 4, on Tuesday, September 7, at 12 noon. G. H. Beaton and H. J. Gold, Liquidators.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

ALUMINIUM CORPORATION, LTD., London, E.C.—Registered July 27, £100,000 debentures. Present issue £60,000; general charge. £324,575. July 14, 1919.

ALBY UNITED CARBIDE FACTORIES, LTD., London, E.C.—Registered July 29, further charge securing £22,947 1/0 to Minister of Munitions; charged on land at Hebburn, and buildings, plant and machinery. £110,000. November 25, 1919.

Satisfaction

GALLITE & RUBBER MANUFACTURING CO., LTD., LONDON, W.—Satisfaction registered July 26, £2,000, registered August 23, 1917.

Bill of Sale

[The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of 1882 and under the Act of 1878. Both kinds require re-registration every five years. Up to the date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.]

MUSKETT, THOMPSON, 101, Gwladys Road, Liverpool.—Drysalter and chemical broker. £100. Filed August 4.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

HUDSON, SAMUEL, Stone Edge, Marple, bleacher. £16. 8s. 5d. June 22.

LUNN, NELSON, 402, Victoria Street, Grimsby, chemist. £12. 8s. 3d. June 29.

NOBLE'S DRUG STORES, LTD., R/O 2, Well Street, Cable Street, E., chemists. £16. 3s. 8d. July 2.

PALMER, F. E., Unthank Road, Norwich, chemists. £20. 6s. 8d. July 1.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.:—

BECCO ENGINEERING & CHEMICAL CO., LTD., Chiswell House, Finsbury Pavement, E.C.2. Manufacturers of plant, machinery and devices for the treatment, purification and filtration of oils, water and other liquids. Nominal capital, £4,000 in 3,000 10 per cent. cumulative participating preference shares of £1 each, and 4,000 ordinary shares of 5s. each. Directors to be appointed by subscribers. Qualification of directors, £100. Remuneration of directors, £200 to be divided.

GROVE CHEMICAL CO., LTD., Imperial House, Kingsway, W.C. 2.—Glue, gelatine and fertiliser manufacturers and merchants. Nominal capital, £100 in 100 shares of £1 each. Managers, British Glues & Chemicals, Ltd.

HANCO GLASS CO., LTD., 223, Ilford Lane, Ilford, Essex.—Manufacturers of glass. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: A. M. Hankinson, J. G. Slieker. Qualification of directors, 1 share. Remuneration of directors £600 each.

E. HARDMAN, SON & CO., LTD., Bedford Street, Wilmington, Hull.—Tar distillers and chemical manufacturers. Nominal capital, £20,000 in 20,000 shares of £1 each. Directors: J. Hardman, E. Hardman (managing directors). Qualification of directors, £100.

CHARLES MASSEY & SON, LTD., Imperial House, Kingsway, W.C. 2.—Glue, gelatine and fertiliser manufacturers and merchants. Nominal capital, £100 in 100 shares of £1 each. Managers, British Glues & Chemicals, Ltd.

Benn Brothers Journals

Some Features of the Current Issues

AERONAUTICS.

"The Air Ministry Tests"; "Duralumin"; Ballooning for All."

THE CABINET MAKER.

"How to Deal with Woodworm"; "Instruction in Cabinet Making at High Wycombe" (illustrated); "Flush Veneering of Large Doors."

THE ELECTRICIAN.

"Reduction in the Temperature of a Wire when Covered with Insulation," by A. B. Eason; "The Human Factor in Industry," by A. Ramsay; "The Optophone."

THE FRUIT-GROWER.

"The Aspidistra as a House Plant"; "Jam Combine and Fruit Prices"; "Agricultural Bill."

THE GAS WORLD.

"Thermal Efficiencies of Gas and Electricity," by C. W. Helps; "An Arbitration for the Municipalization of two Company Gas Undertakings"; the Gas News of the Week.

HARDWARE TRADE JOURNAL.

"Labour Saving in the Foundry" (XIV.); "The Elusive Order" (II.); Leather Trade Notes.

WAYS AND MEANS.

"The Good in the Enemy," by the Editor; "Handicraft and Learning," by Professor J. J. Findlay; "A Specialist Medical Service for Employees," by H. Cooper.